



GARRETT TURBINE ENGINE COMPANY
PHOENIX, ARIZONA

PNEUMATIC AND SHAFT POWER GAS TURBINE ENGINE

PART NO.

381348-1

MODEL NO.

GTCP30-92C(A)

MAINTENANCE MANUAL



MAINTENANCE MANUAL
GTCP30-92C(A)

R

SAFETY ADVISORY

R WARNING: BEFORE USING ANY OF THE MATERIALS CALLED OUT IN THIS PUBLI-
R CATION, BE AWARE OF ALL HANDLING, STORAGE AND DISPOSAL PRE-
R CAUTIONS RECOMMENDED BY THE MANUFACTURER OR SUPPLIER.
R FAILURE TO COMPLY WITH THE MANUFACTURERS' OR SUPPLIERS'
R RECOMMENDATIONS MAY RESULT IN PERSONAL INJURY OR DISEASE.

R This publication describes physical and chemical processes which may require the
R use of chemicals, solvents, paints, and other commercially available materials.
R The user of this publication should obtain the Material Safety Data Sheets (OSHA
R Form 20 or equivalent) from the manufacturers or suppliers of the materials to
R be used. The user must become completely familiar with the manufacturer/
R supplier information and adhere to the procedures, recommendations, warnings and
R cautions set forth for the safe use, handling, storage, and disposal of the
R materials.

RECORD OF REVISIONS

[illegible]



MAINTENANCE MANUAL
GTCP30-92C(A)

RECORD OF REVISIONS

[illegible]

49-23-23-REV-REC
May 11/87

Island Enterprises



MAINTENANCE MANUAL
GTCP30-92C(A)

RECORD OF TEMPORARY REVISIONS

[illegible]

49-23-23-T-R-REC
May 11/87



GARRETT TURBINE ENGINE COMPANY
PHOENIX, ARIZONA

TO: HOLDERS OF PNEUMATIC AND SHAFT POWER GAS TURBINE ENGINE MAINTENANCE MANUAL
REPORT NO. 49-23-23 DATED MAY 28, 1982.

THIS REVISED PUBLICATION IS ISSUED FOR USE IN SUPPORT OF THE FOLLOWING AIRCRAFT.

<u>ENGINE PART NO.</u>	<u>ENGINE MODEL NO.</u>	<u>AIRCRAFT APPLICATION</u>
381348-1	GTCP30-92C(A)	BAe HS125-700 BAe 125-800

REVISION NO. 1 DATED MAY 11, 1987

This is a COMPLETE reissue. Due to the extent of the changes involved in this revision, this publication has been reprinted in its entirety. However, pages or prior issues, which are not affected, retain previous revision dates. Please remove and discard all pages of prior issues and replace with this issue. Temporary Revisions 49-1 through 49-6 are incorporated in this issue.

HIGHLIGHTS

<u>Chapter/Section/Pages</u>	<u>Description of Change</u>
49-23-23	
Title Page	Revised to reflect latest revision date.
Safety Advisory	Added Safety Advisory.
List of Effective Pages	Revised to reflect change date.
Record of Revisions	Added Revision 1.
Record of Temporary Revisions	Revised to reflect current Temporary Revisions incorporated in this revision.
Service Bulletin List	Added Service Bulletins to list.

REPORT NO. 49-23-23-HIGHLIGHTS

Page 1 of 3

May 11/87

Copyright 1987 by The Garrett Corporation



MAINTENANCE MANUAL

<u>Chapter/Section/Pages</u>	<u>Description of Change</u>
Introduction Page 3	Updated Table 1, Equipment Identification List for Part No. 3811348-1.
Page 4	Updated Table 2, Applicable Publications List.
49-20-00 Pages 301 and 302	Revised text to clarify servicing of oil filter element. Updated Table 302, Approved Engine Oils.
Page 304	Revised NOTE to correct time limit on motoring of in-place storage engines.
Pages 305 and 306	Revised text to change reference to servicing oil filter element.
Page 504	Expanded text to include CAUTION against ingestion of water and de-icing fluid during APU operation.
Page 505	Added maximum allowable transient EGT allowable during engine start.
Page 507	Corrected CAUTION on STARTER DUTY CYCLE.
Page 602	Updated Table 601, Periodic Inspection Requirements.
Page 616	Incorporated Temporary Revision 49-4. Updated Table 606, Materials and Compounds.
Pages 617 and 618	Incorporated Temporary Revision 49-5. Revised text to clarify repair of exhaust duct and torus assembly.
Pages 621 through 626	Incorporated Temporary Revisions 49-1 and 49-6.
49-30-00 Contents	Added Description and Operation to Table of Contents.
49-30-14 Pages 204	Figure 202 revised to show correct fuel atomizer.
49-30-20 Page 201	Incorporated Temporary Revision 49-2.



MAINTENANCE MANUAL

<u>Chapter/Section/Pages</u>	<u>Description of Change</u>
49-40-00 Contents	Added Description and Operation and Igniter Plug Lead to Table of Contents
49-40-10 Contents through Page 203	Added art and text for Igniter Plug Lead Maintenance Practices.
49-50-00 Contents	Added Description and Operation to Table of Contents.
49-50-00 Contents	Added Description and Operation to Table of Contents.
49-60-00 Contents	Added Description and Operation to Table of Contents.
49-60-31 Pages 201	Incorporated Temporary Revision 49-3.
49-70-00 Contents	Added Description and Operation to Table of Contents.
49-90-00 Contents	Added Description and Operation to Table of Contents.
49-23-23	Updated Parts Listing.



MAINTENANCE MANUAL
GTCP30-92C(A)

LIST OF EFFECTIVE PAGES
49-23-23

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>
Title Page	-	May 11/87		103	May 28/82
				104	May 28/82
Safety				105	May 28/82
Advisory	-	May 11/87		106	May 28/82
				107	May 28/82
List of				108	May 28/82
Effective	1	May 11/87		109	May 28/82
Pages	2	May 11/87		110	May 28/82
	3	May 11/87		111	May 28/82
	4	May 11/87		112	May 28/82
				113	May 28/82
Record of				114	May 11/87
Revisions	-	May 11/87		115	May 28/82
				116	May 28/82
Record of				117	May 28/82
Temporary				118	May 28/82
Revisions	-	May 11/87		119	May 28/82
				120	May 28/82
Service				121	May 28/82
Bulletin	1	May 11/87		122	May 28/82
List	2	May 11/87		301	May 11/87
				302	May 11/87
Table of				303	May 11/87
Contents	-	May 28/82		304	May 11/87
				305	May 11/87
INTRODUCTION	-	Tab		306	May 11/87
				307	May 28/82
Introduction				308	Blank
Contents	-	May 28/82		401	May 28/82
	1	May 28/82		402	Blank
	2	May 28/82		501	May 28/82
	3	May 11/87		502	May 28/82
	4	May 11/87		503	May 28/82
				504	May 11/87
ENGINE	-	Tab		505	May 11/87
				506	May 11/87
49-20-00				507	May 11/87
Contents	-	May 11/87		508	May 28/82
	1	May 28/82		509	May 11/87
	2	May 11/87		510	May 11/87
	3	May 28/82		511	May 28/82
	4	May 28/82		512	May 11/87
	5	May 28/82		513	May 11/87
	6	May 28/82		514	May 11/87
	101	May 28/82		515	May 11/87
	102	May 28/82		516	May 11/87



MAINTENANCE MANUAL GTCP30-92C(A)

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>
	601	May 28/82	Contents	-	May 11/87
	602	May 11/87		1	May 28/82
	603	May 28/82		2	Blank
	604	May 28/82	49-30-14		
	605	May 28/82	Contents	-	May 28/82
	606	May 28/82		201	May 28/82
	607	May 28/82		202	May 28/82
	608	May 11/87		203	May 28/82
	609	May 28/82		204	May 11/87
	610	May 28/82		205	May 28/82
	611	May 28/82		206	May 28/82
	612	May 11/87	49-30-15		
	613	May 28/82	Contents	-	May 28/82
	614	May 28/82		201	May 28/82
	615	May 11/87		202	May 28/82
	616	May 11/87		203	May 28/82
	617	May 11/87		204	Blank
	618	May 11/87	49-30-16		
	619	May 11/87	Contents	-	May 28/82
	620	May 28/82		201	May 28/82
	621	May 11/87		202	May 28/82
	622	May 28/82	49-30-19		
	623	May 11/87	Contents	-	May 28/82
	624	May 11/87		201	May 28/82
	625	May 11/87		202	May 28/82
	626	May 11/87	49-30-20		
	627	May 11/87	Contents	-	May 28/82
	628	May 11/87		201	May 11/87
49-20-01				202	May 28/82
Contents	-	May 28/82		203	May 11/87
	201	May 28/82		204	Blank
	202	Blank	IGNITION/ STARTING	-	Tab
49-20-04					
Contents	-	May 28/82	49-40-00		
	201	May 28/82	Contents	-	May 11/87
	202	May 28/82		1	May 28/82
	203	May 28/82		2	Blank
	204	May 28/82			
49-20-05			49-40-10		
Contents	-	May 28/82	Contents	-	May 11/87
	201	May 28/82		201	May 11/87
	202	May 28/82		202	May 11/87
	203	May 28/82		203	May 11/87
	204	Blank		204	Blank
ENGINE FUEL AND CONTROLS	-	Tab	49-40-11		
			Contents	-	May 28/82
				201	May 28/82
				202	May 28/82
49-30-00			49-40-13		



MAINTENANCE MANUAL
GTCP30-92C(A)

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>
Contents	-	May 28/82		202	May 28/82
	201	May 28/82	OIL	-	Tab
	202	May 28/82			
AIR	-	Tab	49-90-00		
49-50-00			Contents	-	May 11/87
Contents	-	May 11/87		1	May 28/82
	1	May 28/82		2	Blank
	2	Blank	49-90-15		
49-50-04			Contents	-	May 28/82
Contents	-	May 11/87		201	May 28/82
	201	May 11/87		202	May 28/82
	202	May 11/87	49-90-18		
	203	Deleted	Contents	-	May 28/82
	204	Deleted		201	May 28/82
ENGINE				202	May 28/82
CONTROLS	-	Tab	49-90-20		
49-60-00			Contents	-	May 28/82
Contents	-	May 11/87		201	May 28/82
	1	May 28/82		202	May 28/82
	2	Blank	REPLACEMENT		
49-60-31			PARTS LIST	-	Tab
Contents	-	May 28/82	49-23-23		
	201	May 11/87	Contents	-	May 28/82
	202	May 28/82		1101	May 28/82
	202A	May 11/87		1102	May 11/87
	202B	Blank		1103	May 11/87
	203	May 11/87		1104	Blank
	204	May 28/82	Numerical		
	205	May 11/87	Index		
	206	May 28/82	Alpha	1105	May 11/87
INDICATING	-	Tab		1106	May 11/87
49-70-00				1107	May 11/87
Contents	-	May 11/87		1108	May 11/87
	1	May 28/82	Numeric	1109	May 11/87
	2	Blank		1110	May 11/87
49-70-20				1111	May 11/87
Contents	-	May 28/82	Illustrated		
	201	May 28/82	Parts List		
	202	May 28/82		1112	May 11/87
49-70-22				1113	May 11/87
Contents	-	May 28/82		1114	May 11/87
	201	May 28/82		1115	May 11/87
	202	May 28/82		1116	May 11/87
49-70-39				1117	May 11/87
Contents	-	May 28/82		1118	May 11/87
	201	May 28/82		1119	May 11/87
				1120	May 11/87
				1121	May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>
	1122	May 11/87			
	1123	May 11/87			
	1124	May 11/87			
	1125	May 11/87			
	1126	May 11/87			
	1127	May 11/87			
	1128	May 11/87			
	1129	May 11/87			
	1130	May 11/87			
	1131	May 11/87			
	1132	May 11/87			
	1133	May 11/87			
	1134	May 11/87			
	1135	May 11/87			
	1136	May 11/87			
	1137	May 11/87			
	1138	May 11/87			
	1139	May 11/87			
	1140	May 11/87			
	1141	May 11/87			
	1142	May 11/87			
	1143	May 11/87			
	1144	May 11/87			
	1145	May 11/87			
	1146	May 11/87			
	1147	May 11/87			
	1148	May 11/87			
	1149	May 11/87			
	1150	Blank			
	1151 thru				
	1158	Deleted			



MAINTENANCE MANUAL
GTCP30-92C(A)

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>CHAPTER/ SECTION</u>
INTRODUCTION	49-23-23
ENGINE SECTION	49-20-00
ENGINE FUEL AND CONTROL SECTION	49-30-00
IGNITION/STARTING SECTION	49-40-00
AIR SECTION	49-50-00
ENGINE CONTROLS SECTION	49-60-00
INDICATING SECTION	49-70-00
OIL SECTION	49-90-00

REFER TO APPLICABLE CHAPTER/SECTION FOR EXPANDED CONTENTS



MAINTENANCE MANUAL
GTCP30-92C(A)

SERVICE BULLETIN LIST

	<u>Service Bulletin</u>	<u>Incorp.</u>	<u>Title</u>
R	49-6003	May 11/87	Convert APU Model GTCP30-92C to GTCP30-92C(A) or Model GTCP30-92C(A) to Model GTCP30-92C
R			
R			
R	49-6020	May 11/87	Sealing of Tachometer Generator to Prevent Oil Leakage from Going Into Compressor Inlet of APU
R			
R			



MAINTENANCE MANUAL
GTCP30-92C(A)

SERVICE BULLETIN LIST (CONT)

<u>Spare Parts Bulletin</u>	<u>Incorp.</u>	<u>Title</u>
R GTE0412	May 11/87	Spare Parts Change Notification



MAINTENANCE MANUAL
GTCP30-92C(A)

INTRODUCTION

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
General	1
Equipment Configuration	1
Applicable Publications	2

INTRODUCTION
49-23-23-CONTENTS
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

INTRODUCTION

1. General

This publication provides instructions for the equipment listed in Table 1, Equipment Identification List, manufactured by Garrett Turbine Engine Company, A Division of the Garrett Corporation, P.O. Box 29003, Phoenix, AZ 85038.

This publication is prepared in accordance with Air Transport Association Specification No. 100. Definitions of words and terms used in this publication are as stipulated therein.

2. Equipment Configuration

The exact configuration of the equipment may be determined by noting the part number, model number, series number, and change number(s) stamped on the identification plate.

The word REPLACES (or the notation REPL) means this part is newer and therefore, probably more desirable than the REPLACED BY (REPL BY) part; however, either part may be used.

The word Alternate (ALT) means either part may be used and that neither part is more desirable than the other.

When a part is identified and also referenced (RF), the quantity for that part is either listed elsewhere in the catalog or in a referenced catalog listed in the nomenclature column. If the listed catalog is a vendors catalog, the vendors code is also listed.

Parts changed, added, or deleted by service bulletin action are identified by the applicable service bulletin number in the nomenclature column of the affected part. Illustrations applicable to a particular modification or configuration, are identified by the insertion of the applicable service bulletin preceding the illustration title. In some instances there are gaps in item number sequence and the item numbers are not continuously sequential.

The Equipment Identification List table(s) (1 through last listed alpha suffix) provide the following information.

Changes incorporated into the equipment by specific series number.

General description of the change, and where applicable, the number of the service bulletin that incorporated the modification into specific production of overhauled equipment.



MAINTENANCE MANUAL
GTCP30-92C(A)

NOTE: Non-interchangeable configuration may be initiated at production or when authorized by service bulletin at overhaul or maintenance level. The production incorporation point and service bulletin authorizing a non-interchangeable configuration can be determined by referring to Table 1.

Parts deleted or added are identified within the nomenclature column for the affected part.

3. Applicable Publications

The nomenclature, part number, and publication report number(s) of accessories covered in separate publications are listed in Table 2, Applicable Publications List.



MAINTENANCE MANUAL
GTCP30-92C(A)

Table 1. Equipment Identification List
for Part No. 381348-1

Series No. Change No.		Description	Service Bulletin
1	-	Original Configuration	-
R 2	Series 1 plus		
R	Change 1		
R	1	Improved Gasket Material	-



MAINTENANCE MANUAL
GTCP30-92C(A)

Table 2. Applicable Publications List

Nomenclature		Part No.	Publication	Type
R R	Pneumatic and Shaft Power Gas Turbine Engine	381348-1	49-23-25	IPC
			49-23-51	OH
			49-22-57	IRM
R	Pneumatic Thermostat	107996-X	49-70-36	OH/PB
R	Fuel Atomizer Assembly	369945-X	49-30-39	OH/PB
R	Fuel Control Assembly	394206-X	49-30-47	OH/PB
R	Igniter Plug Lead	369259-X	49-41-05	OH/PB



MAINTENANCE MANUAL
GTCP30-92C(A)

ENGINE SECTION

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>CHAPTER/ SECTION/ SUBJECT</u>	<u>PAGE</u>
ENGINE SECTION	49-20-00	
Description and Operation		1
Trouble Shooting		101
Servicing		301
Removal/Installation		401
Adjustment/Test		501
Inspection/Check		601



MAINTENANCE MANUAL
GTCP30-92C(A)

ENGINE SECTION - DESCRIPTION AND OPERATION

1. General

The pneumatic and shaft power gas turbine engine is designed for aircraft auxiliary power. The engine provides mechanical shaft power for driving aircraft accessories and provides pneumatic bleed-air power for other auxiliary aircraft uses.

The physical and operational characteristics of the pneumatic and shaft power gas turbine engine are listed in Table 1.

Table 1. Leading Particulars

Engine Dimensions (Approx)

Length	24.0 in.
Width	21.0 in.
Height	19.0 in.
Weight (dry)	
GTCP30-92C(A)	(Approx) 102 lb

Fuel System Requirements

Fuel Specification Fuel Inlet Temperature
for Starting and Operating

<u>Fuel</u>	<u>Minimum*</u>	<u>Maximum</u>
MIL-T-5624		
Grade JP-4	-54C (-65F)	57.2C (135F)
JP-5	-29C (-20F)	57.2C (135F)
TWA1005		
Type I	-29C (-20F)	57.2C (135F)
Type II	-40C (-40F)	57.2C (135F)
Allison		
EMS65-3	-40C (-40F)	57.2C (135F)
Kerosene		
(Shell 640)	-29C (-20F)	57.2C (135F)
MIL-G-5572		
(All grades)	-40C (-40F)	57.2C (135F)
DERD 249	-29C (-20F)	57.2C (135F)
DERD 2486	-54C (-65F)	57.2C (135F)
ASTM D 1655	-45.6C (-50F)	57.2C (135F)
Type A, B 66T		
ASTM D 1655	-40C (-40F)	57.2C (135F)
Type A-1 66T		

*Or at a temperature corresponding to fuel viscosity of not more than 15 centistokes.



MAINTENANCE MANUAL
GTCP30-92C(A)

Table 1. Leading Particulars (Cont)

<u>Fuel</u>	<u>Minimum*</u>	<u>Maximum</u>
Foreign fuels:		
USSR		
TI	-29C (-20F)	57.2C (135F)
TC1, TS1	-40C (-40F)	57.2C (135F)
PL4A, PL4B	-40C (-40F)	57.2C (135F)
Fuel Consumption (at rated power)	72.5	PHR max.
Fuel Control Start Pressure (Acceleration Limiter) Valve Crack Press	See Adjustment/Test	
Fuel Inlet Pressure	15	psig max.
Control Air Pressure	23	psig
Engine Ratings (standard sea level pressure) Engine Speed (nom)		
Rotor Speed (no-load)	(max.)	60,400 rpm
Rotor Speed (rated)	59,000 ±200	rpm
Rotor Speed (allowed)	(max.)	64,900 rpm
Output Shaft	8,000	rpm
Engine Start Time	9 to 13	seconds (0 to no-load governed speed 60,400 rpm)
Engine Temperatures		
Maximum Allowable (transient during start, aircraft indicator) ...	455C	(850F)
Maximum Allowable (steady state, aircraft indicator)	649C	(1200F)
Acceleration Thermostat set point	688C	(1270F)
Ambient Operating Range	-54 to 55C	(-65 to 130F)
Oil, maximum allowable	121C	(250F)
Electrical System		
Power for Starts	24 vdc, 500 amp	(800 amp momentary)
Power for Operation	24 vdc, 10	amp
Lubrication System		
Oil Capacity	2.0	qts
Oil Consumption	0.15	lb/hr max.
Oil Pressure at Calibration Pressure Port	35 ±1	psig
Oil Pressure at remote filter	not more than 5 psig above calibration port measurement.	

*Or at a temperature corresponding to fuel viscosity of not more than 15 centi-stokes.



MAINTENANCE MANUAL
GTCP30-92C(A)

Table 1. Leading Particulars (Cont)

Lubrication System (Cont)

Oil Pressure at Remote Filter

Monitor Port 35 to 45 psig

Oil Type (Refer to table 302)
MIL-L-7808 or MIL-L-23699

2. Description

The pneumatic and shaft power gas turbine engine consists of a gear drive assembly, a compressor and turbine rotating assembly, combustion chamber components, enclosing plenum and housing, a lubrication system, a fuel system, and an electrical system.

The gear drive assembly consists of a reduction gear train with output and accessory drives of required rpm. The enclosing housing assembly incorporates an integral oil reservoir sump. The housing assembly provides support for the rotating assembly bearing carrier. The rotating assembly consists of a single stage compressor impeller and a single stage turbine wheel mounted on a common shaft and supported by ball bearings enclosed in a carrier. A torsion shaft connects the compressor-turbine shaft to the gear train. The compressor impeller and turbine wheel are separated by a seal assembly. The compressor impeller is enclosed by a diffuser housing and an inlet screen.

The turbine wheel is enclosed by a containment system consisting of an inner and outer containment shroud, a turbine torus, and a supporting cone.

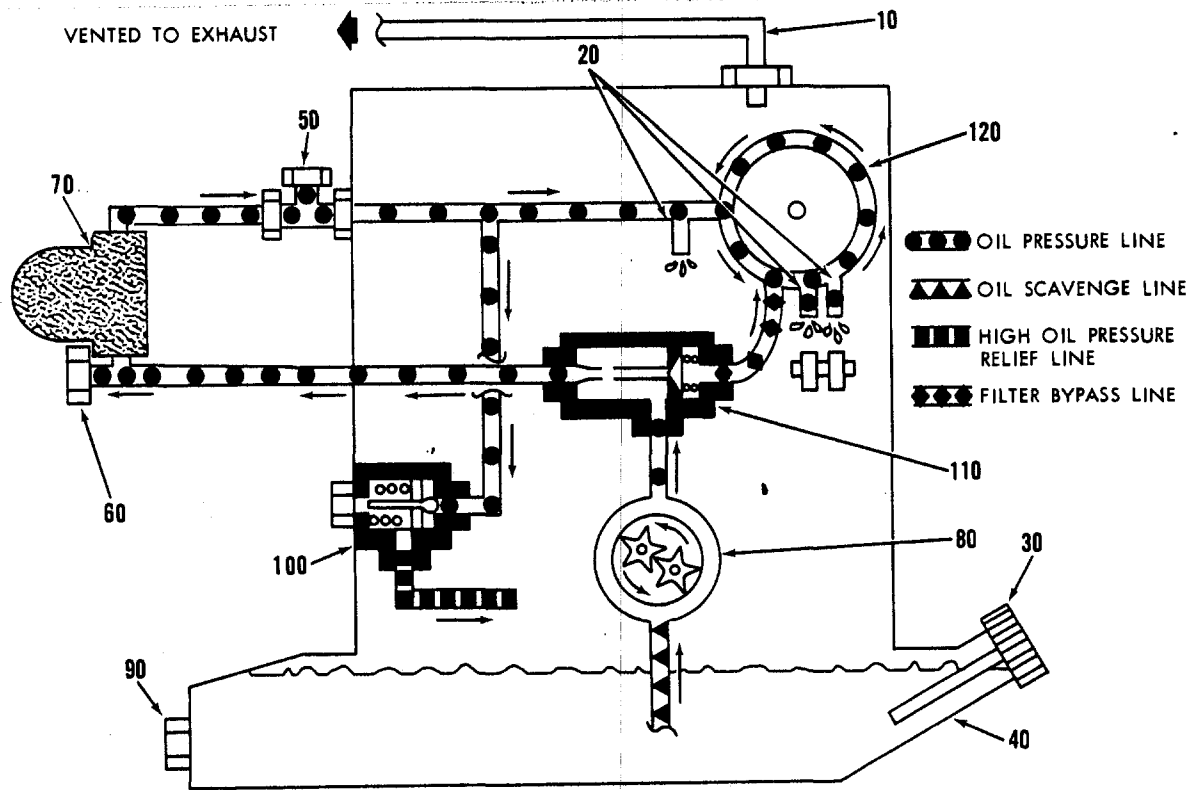
The combustion chamber is formed by integral parts of the turbine plenum and torus assemblies and includes a combustion chamber liner assembly and a cap assembly. The cap assembly is attached to a flange on the plenum assembly and supports the fuel atomizer assembly and igniter plug. The combustion chamber liner assembly is secured to the cap assembly at one end and mates with the torus assembly at the discharge end.

All components of the engine lubrication system (figure 1) except the oil filter assembly are contained within the gear drive housing. The oil filter assembly is remotely located.

The housing provides the oil reservoir sump and incorporates cast fins in the sump area for oil cooling. An oil filler neck in the housing includes a gage-rod cap assembly. A two-gear pressure oil pump assembly is mounted within the gear drive housing and is driven by a gear in the gear drive assembly. The pump delivers pressurized lubrication through three jets to the two bearings on the rotating assembly, the pinion bearings and to the gear drive assembly. An oil filter filters all oil delivered to the jets. A spring-loaded poppet type relief valve mounted in the gear drive housing adjacent to the filter provides oil flow if the filter is clogged. A spring-loaded oil pressure regulator mounted in the housing provides bypass



MAINTENANCE MANUAL
GTCP30-92C(A)



S-19A-1318

- | | |
|-------------------------------|-----------------------------|
| 10. ACCESSORY CASE VENT | 80. OIL PUMP |
| 20. OIL JETS | 90. DRAIN PLUG |
| 30. FILLER NECK AND CAP ASSY | 100. OIL PRESSURE REGULATOR |
| 40. OIL SUMP | ASSY (HIGH PRESSURE RELIEF) |
| 50. CALIBRATION PRESSURE PORT | 110. PRESSURE RELIEF VALVE |
| 60. MONITOR PRESSURE PORT | (OIL FILTER RELIEF) |
| 70. OIL FILTER ASSY | 120. OIL ANNULUS |

Engine Lubrication System
Figure 1

49-20-00
Page 4
May 28/82



MAINTENANCE MANUAL GTCP30-92C(A)

of oil in case of excessive oil pressure. The gear drive housing is vented to equalize internal and external pressures. The lubrication system includes an oil pump, oil filter, oil filter relief valve, and an oil pressure regulator assembly.

3. Operation

A check valve in the engine fuel system (figure 2) at the atomizer prevents fuel flow to the fuel atomizer assembly until fuel pressure reaches five psig. The valve keeps the fuel line primed when the engine is not operating. When fuel flow to the atomizer assembly occurs, the atomizer assembly sprays fuel into the combustion chamber liner where it mixes with the compressed air, then the mixture is ignited by the igniter plug. The hot gases are directed through a torus and a nozzle onto the blades of the turbine wheel to impart mechanical rotating energy to the wheel. Acceleration continues through the combined forces of the starter/generator and the rotating turbine wheel. The starter/generator continues to draw current and aids in driving the engine until the generator output voltage exceeds the battery voltage. When this occurs, the current transformers sense the reverse current and shuts off starting power to the starter/generator. The engine continues to accelerate until governed speed is attained.

During operation of the engine at normal speed fuel flow is controlled by the flyweight-type governor in the engine fuel control assembly. The governor is driven by the fuel control drive shaft, which in turn is driven through the engine gear train. When engine speed exceeds governed speed, the governor flyweights move outward to open a slide valve to bypass fuel. When a decrease in engine speed occurs, the governor flyweights move inward to close the slide valve and permit greater fuel flow.

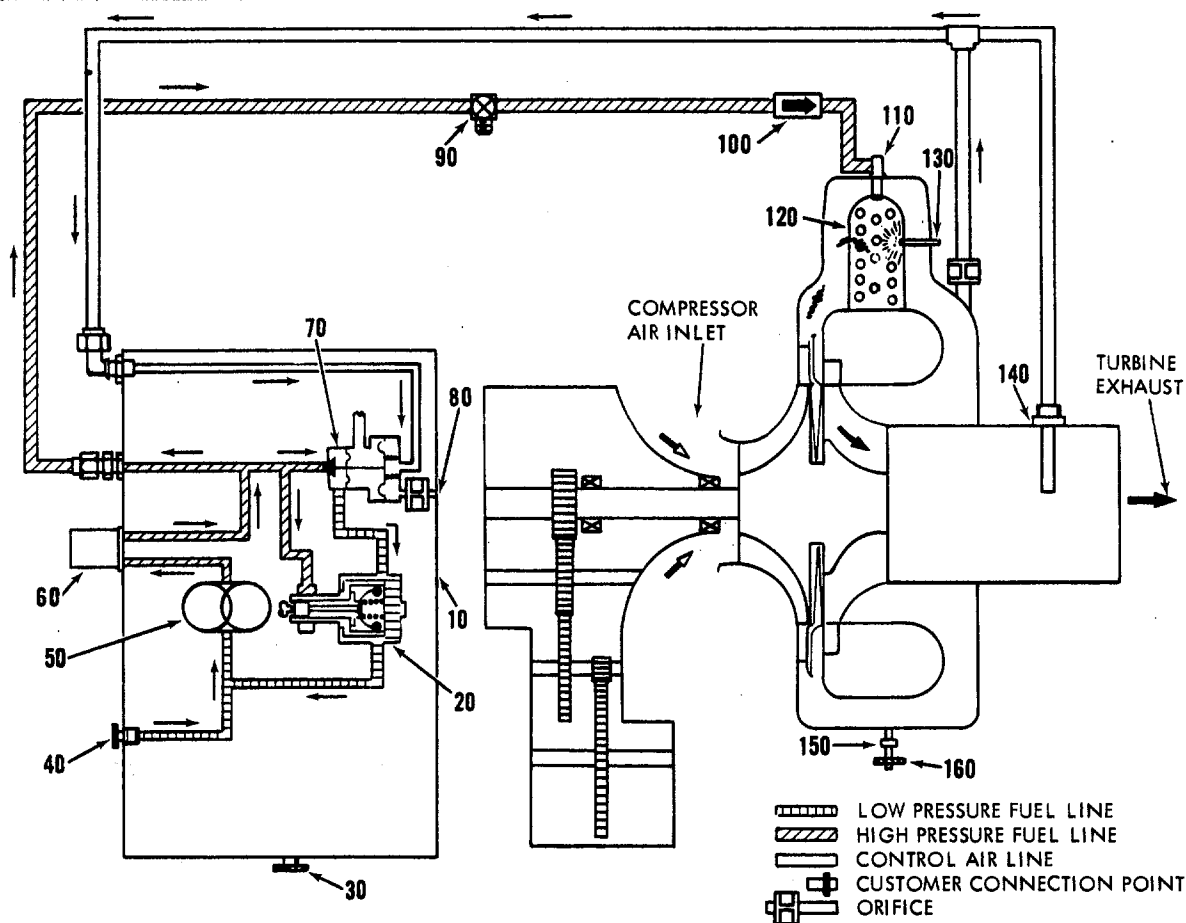
The oil pump picks up oil from the reservoir in the bottom of the gear drive housing and routes it under pressure through the filter to the oil jets. The relief valve allows oil flow to the jets even though the filter becomes clogged. The relief valve prevents an excessive pressure buildup in the system, routing excess oil back to the reservoir.

Engines are provided with a remotely located shock mounted speed switch.

The engine may be stopped by pressing the panel mounted "Start" (Momentary) "Run" and "Stop" switch to the stop position. This furnishes an overspeed signal to the overspeed switch which reacts to interrupt electrical power to the fuel solenoid valve, cutting off fuel supply to the engine. This procedure also supplies an operational check of the overspeed protection circuitry of the speed switch.



MAINTENANCE MANUAL
GTCP30-92C(A)



S-19A-1317

- 10. FUEL CONTROL ASSY
- 20. GOVERNOR ASSY
- 30. FUEL DRAIN CONNECTION
- 40. FUEL SUPPLY INLET CONNECTION
- 50. FUEL PUMP
- 60. FUEL FILTER
- 70. ACCELERATION LIMITER VALVE
- 80. MOISTURE DRAIN
- 90. FUEL SOLENOID VALVE

- 100. CHECK VALVE
- 110. FUEL ATOMIZER ASSY
- 120. COMBUSTION CHAMBER LINER ASSY
- 130. IGNITER PLUG
- 140. OVERTEMPERATURE THERMOSTAT
- 150. TURBINE FUEL DRAIN VALVE
- 160. PLENUM DRAIN CONNECTION

Engine Fuel and Control System
Figure 2

49-20-00
Page 6
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

ENGINE - TROUBLE SHOOTING

1. Trouble Shooting

Trouble shooting information is presented in chart form. Refer to trouble shooting procedures to determine the appropriate procedure for a particular trouble. These procedures should be used as guides for determining and correcting causes of engine malfunction. Simple and easily diagnosed troubles such as broken wires, loose connections, and so forth, are not included in the procedures. Troubles due to defective test or customer instrumentation and setup are not included in the procedures except those directly involved with engine operation. In general, when diagnosing and isolating engine malfunction the procedures should be used.

The engine systems schematics and diagrams included in 49-20-00, DESCRIPTION AND OPERATION, should be used freely as an aid to analyzing engine malfunction. A reasonable understanding of the design and functions of the engine sections, systems, and individual components, which can be obtained by careful reading of the description paragraphs, will also be valuable in checking engine operation.

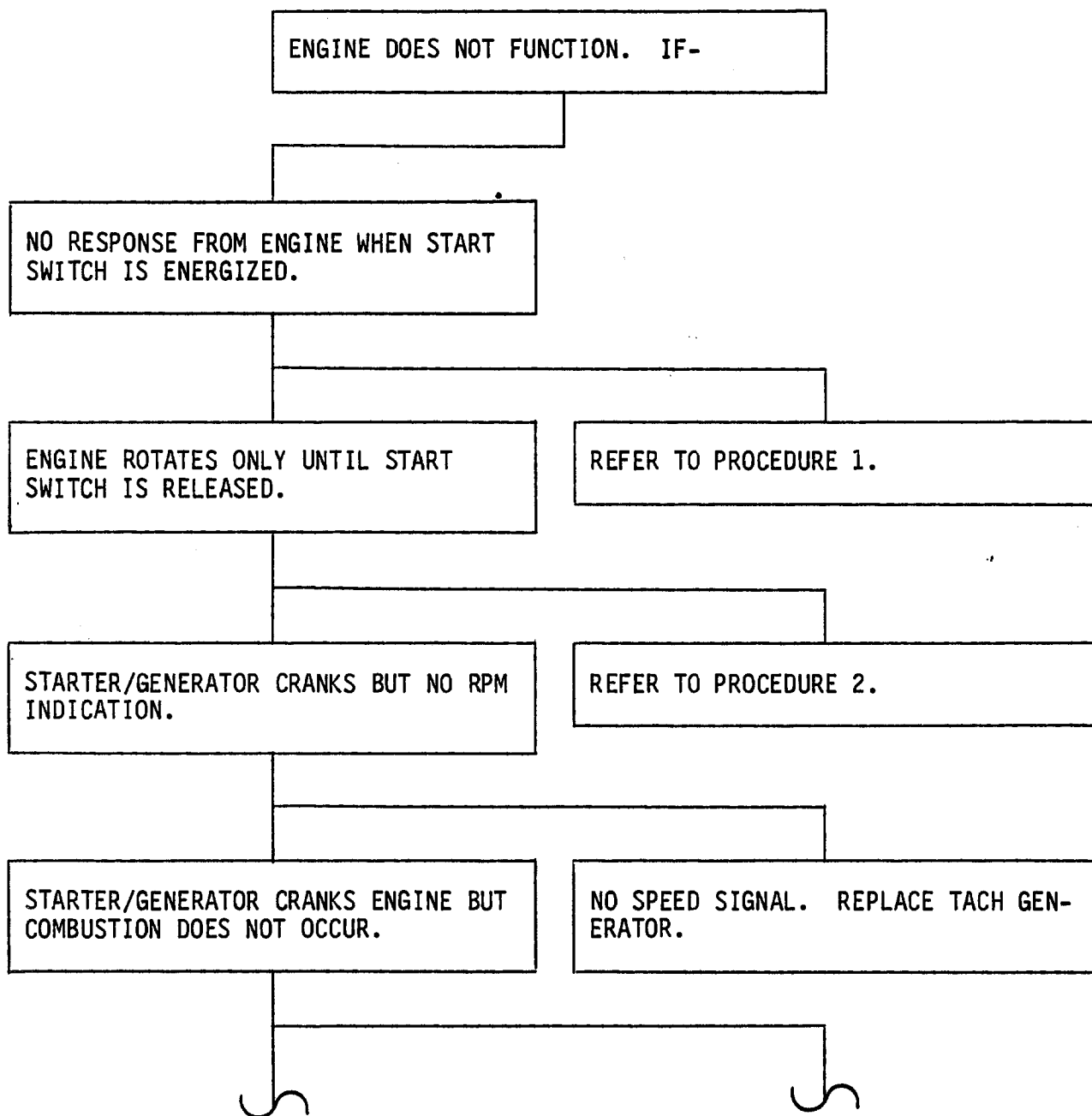
2. Wiring Schematic Diagram

Wiring schematic diagram, Figure 101 is provided as an aid to trouble shooting.



MAINTENANCE MANUAL
GTCP30-92C(A)

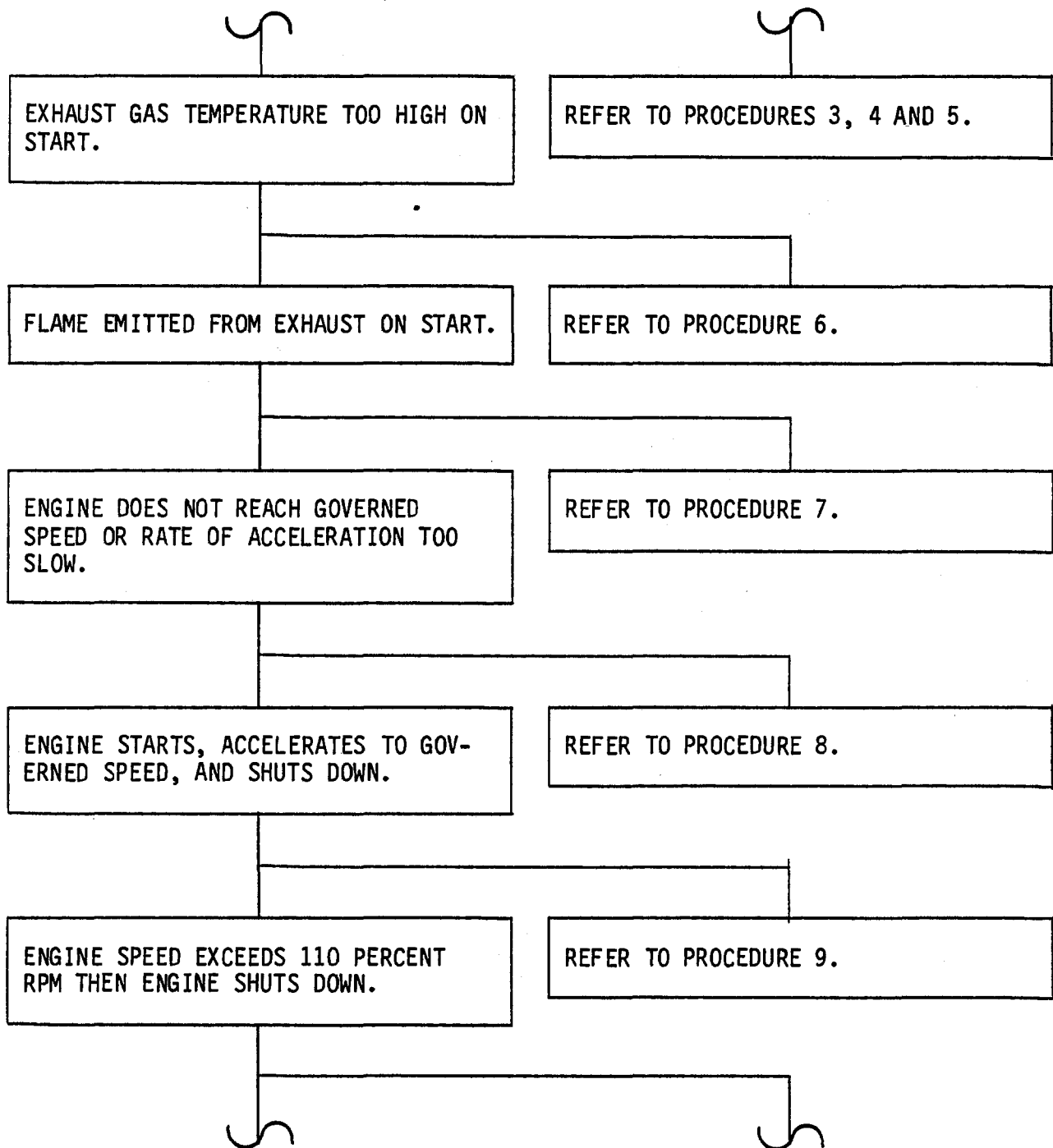
TROUBLE SHOOTING PROCEDURES





MAINTENANCE MANUAL
GTCP30-92C(A)

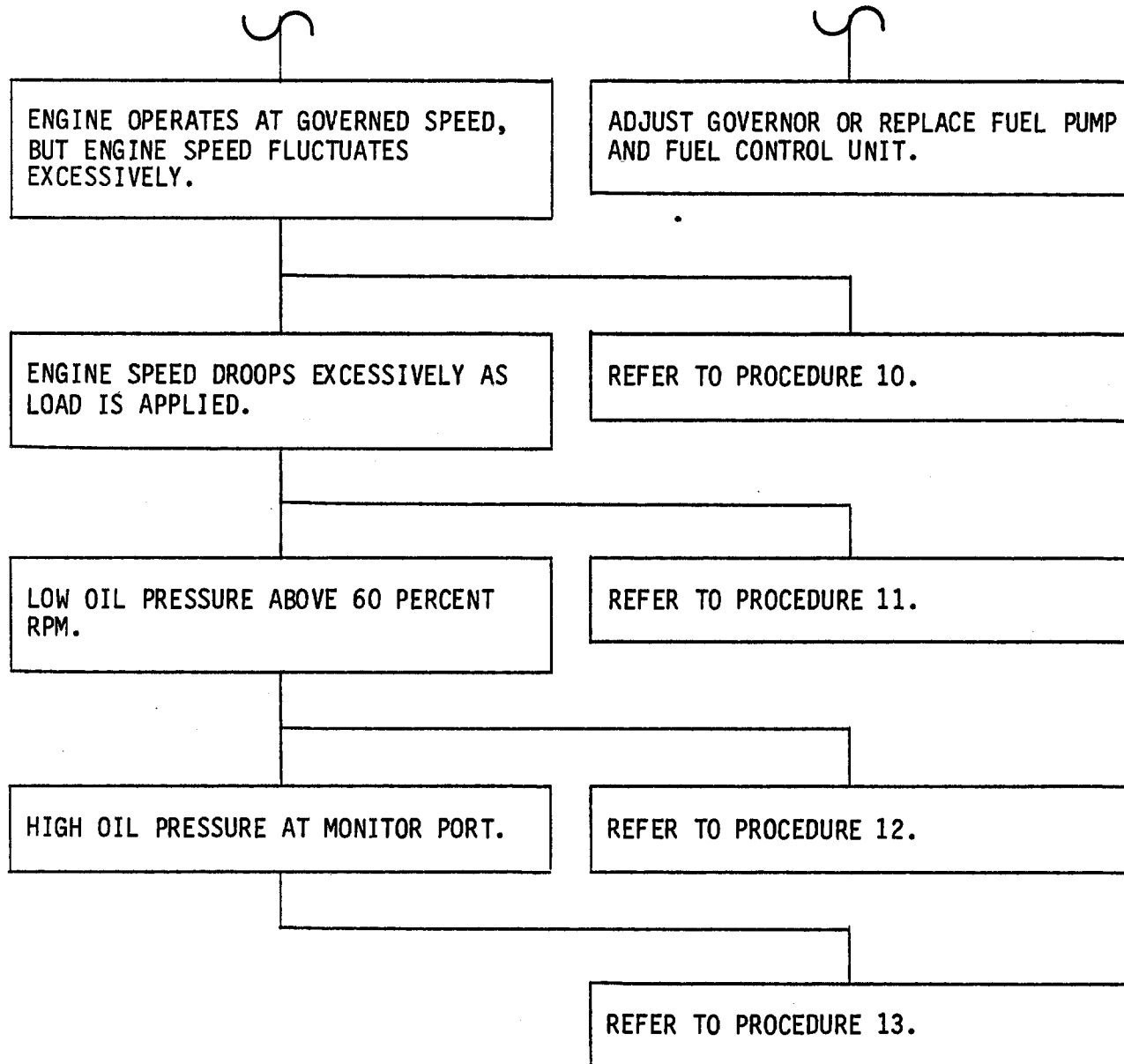
TROUBLE SHOOTING PROCEDURES (CONT)





MAINTENANCE MANUAL
GTCP30-92C(A)

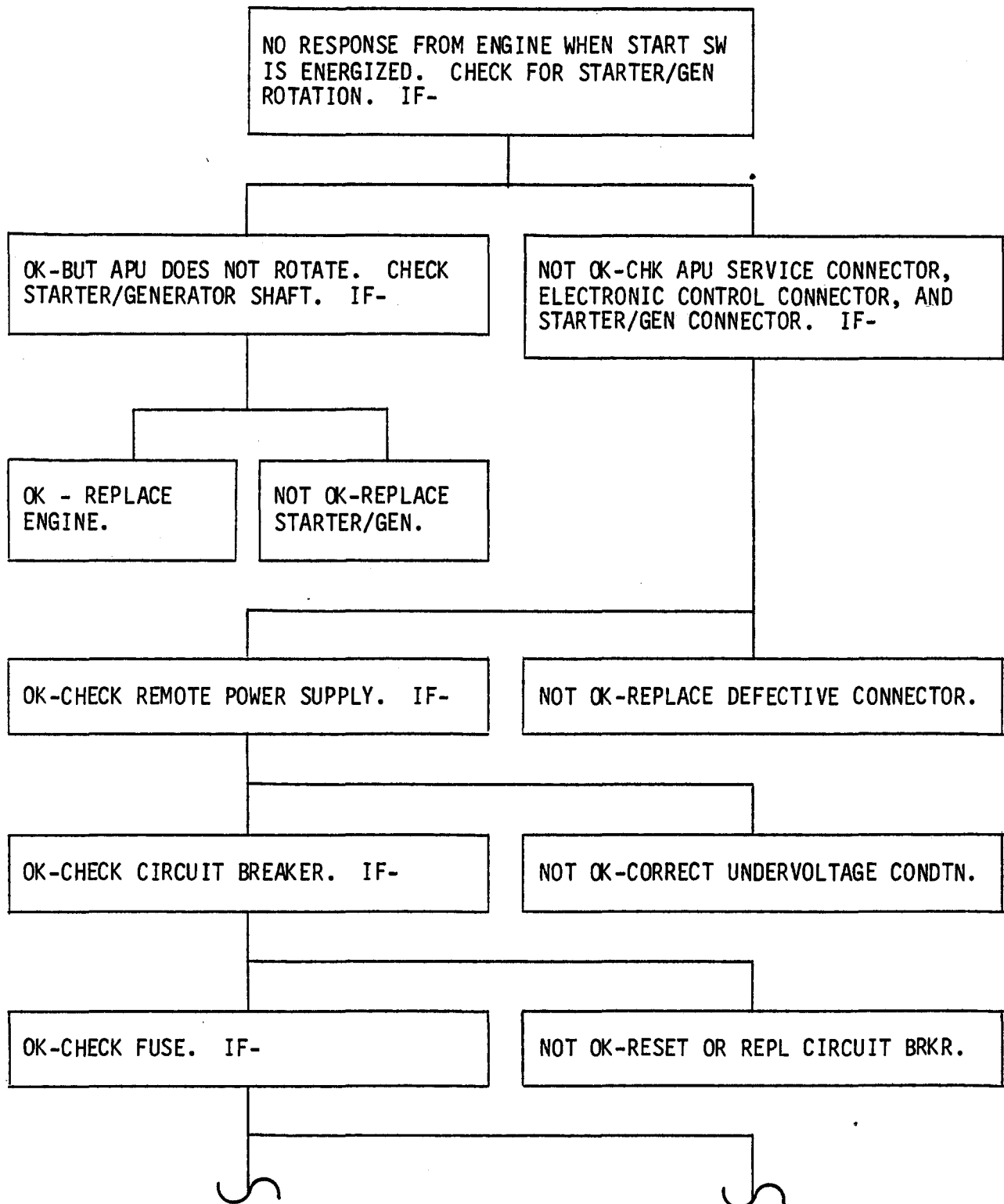
TROUBLE SHOOTING PROCEDURES (CONT)





MAINTENANCE MANUAL
GTCP30-92C(A)

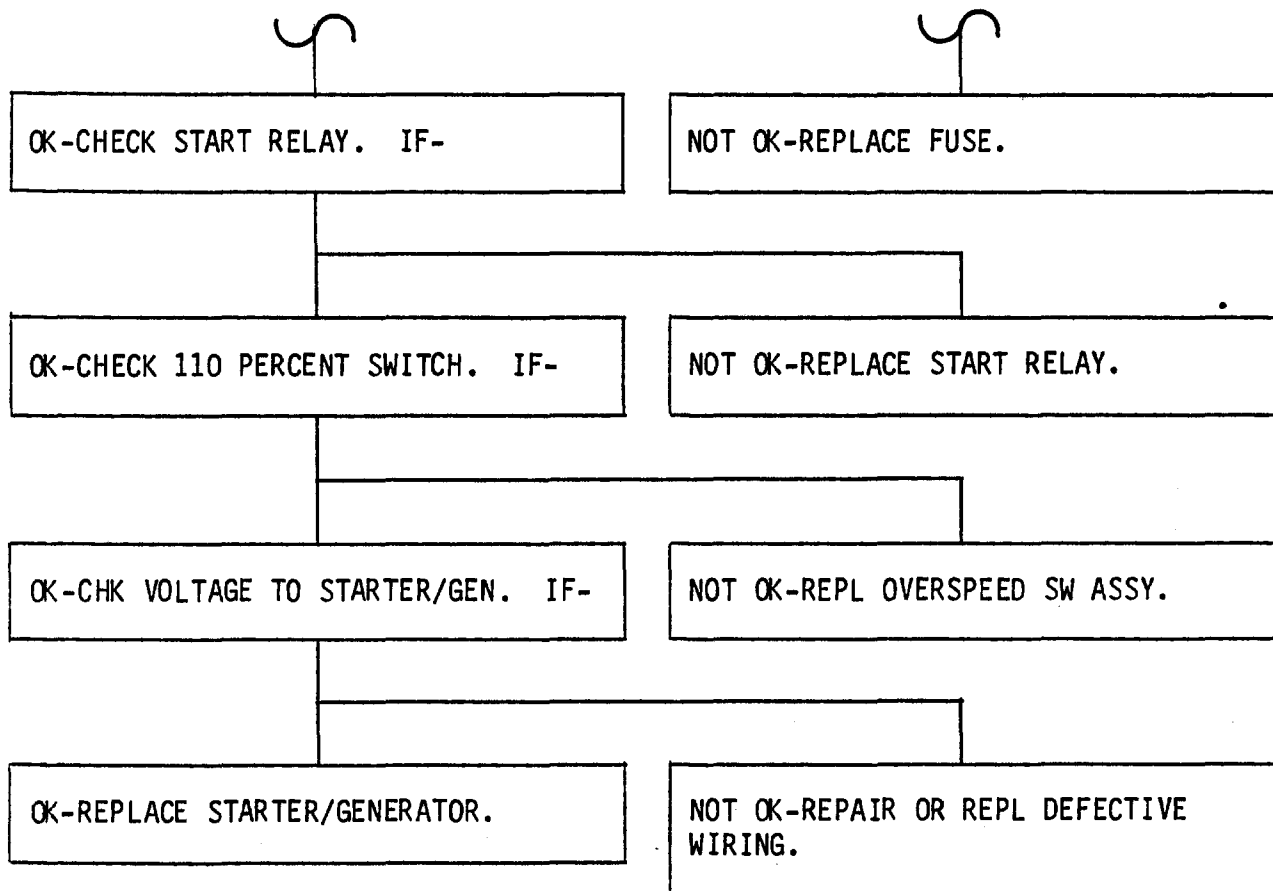
PROCEDURE 1





MAINTENANCE MANUAL
GTCP30-92C(A)

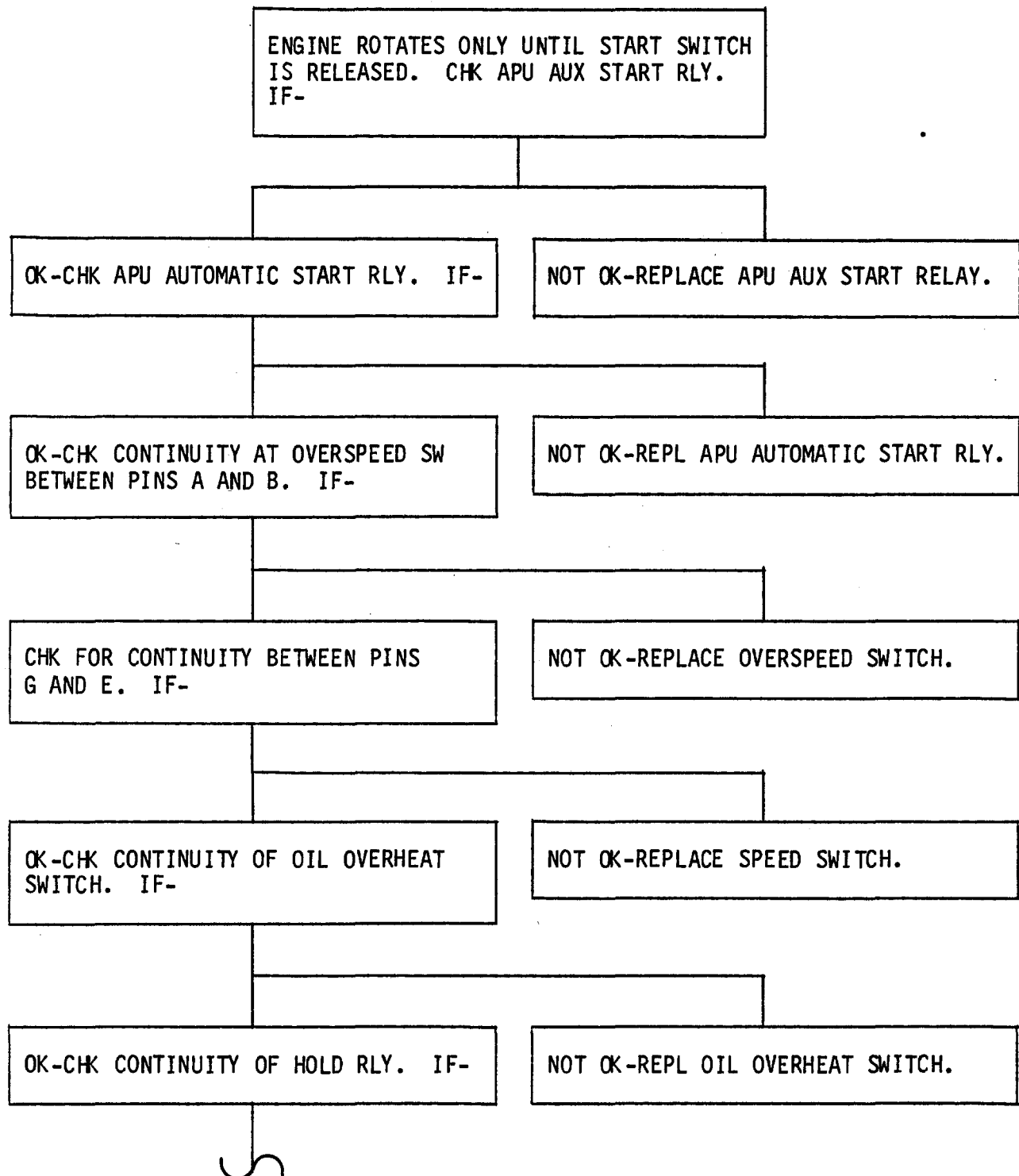
PROCEDURE 1 (CONT)





MAINTENANCE MANUAL
GTCP30-92C(A)

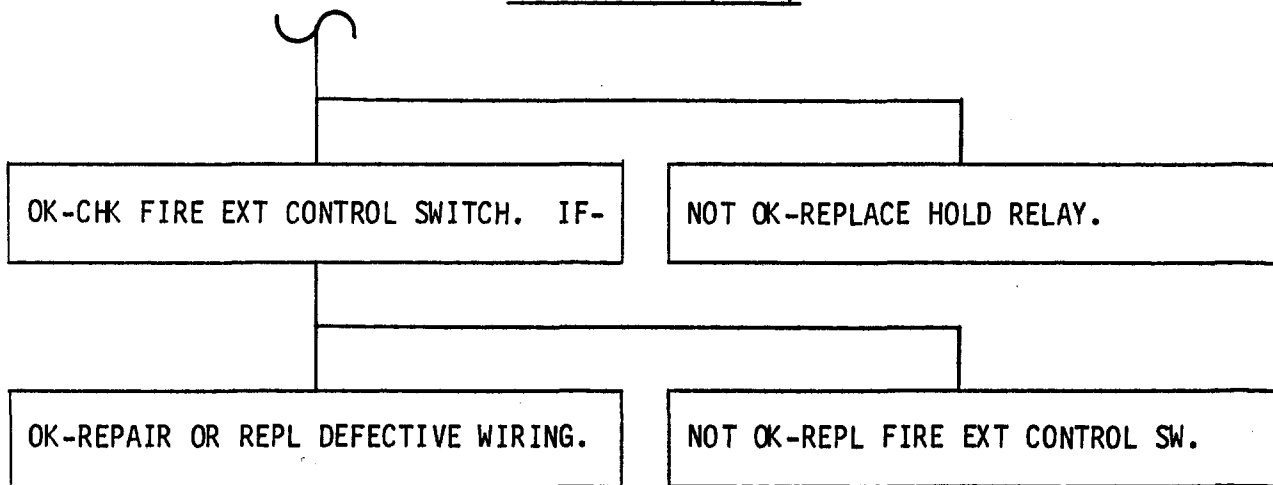
PROCEDURE 2





MAINTENANCE MANUAL
GTCP30-92C(A)

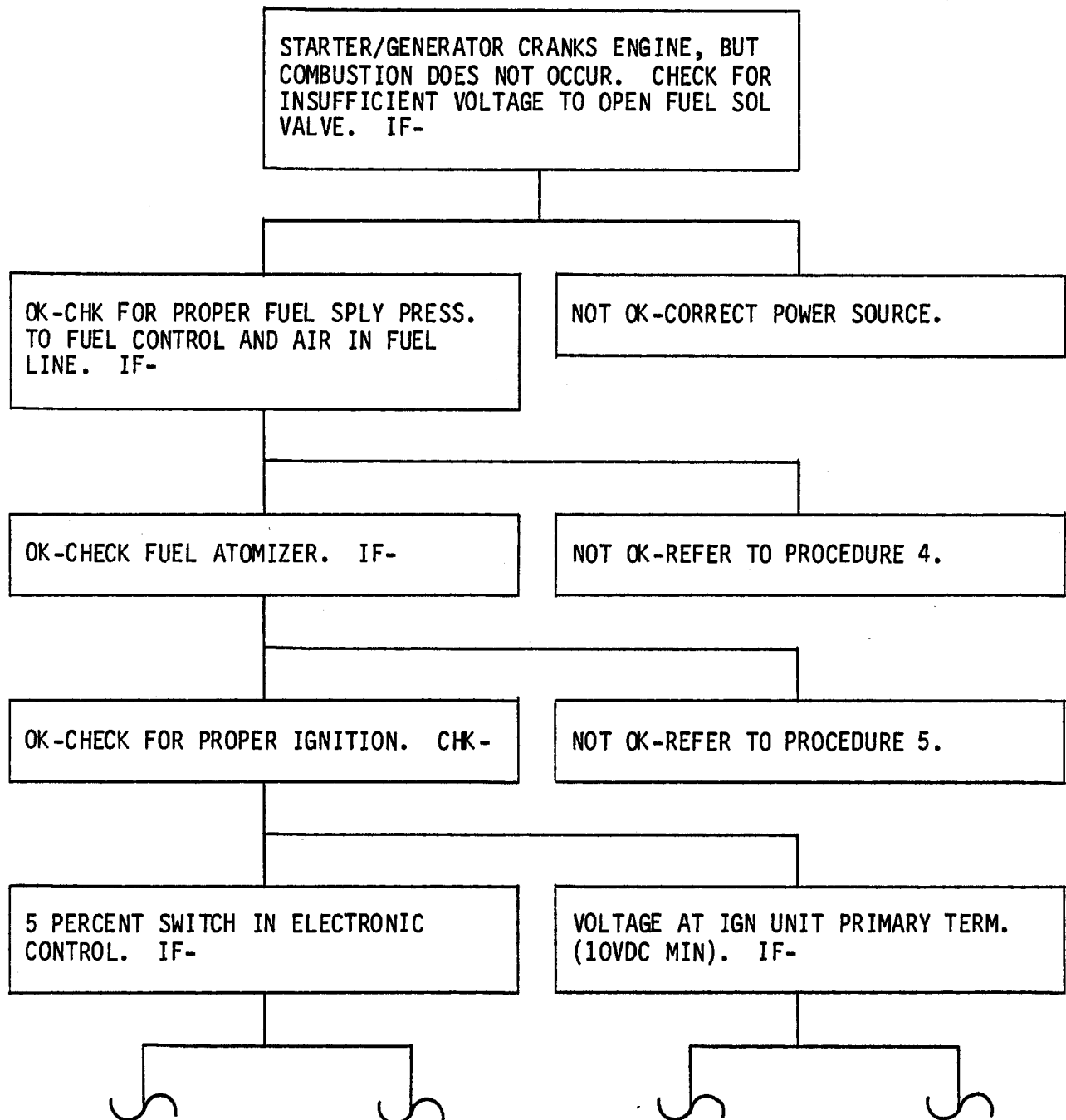
PROCEDURE 2 (CONT)





MAINTENANCE MANUAL
GTCP30-92C(A)

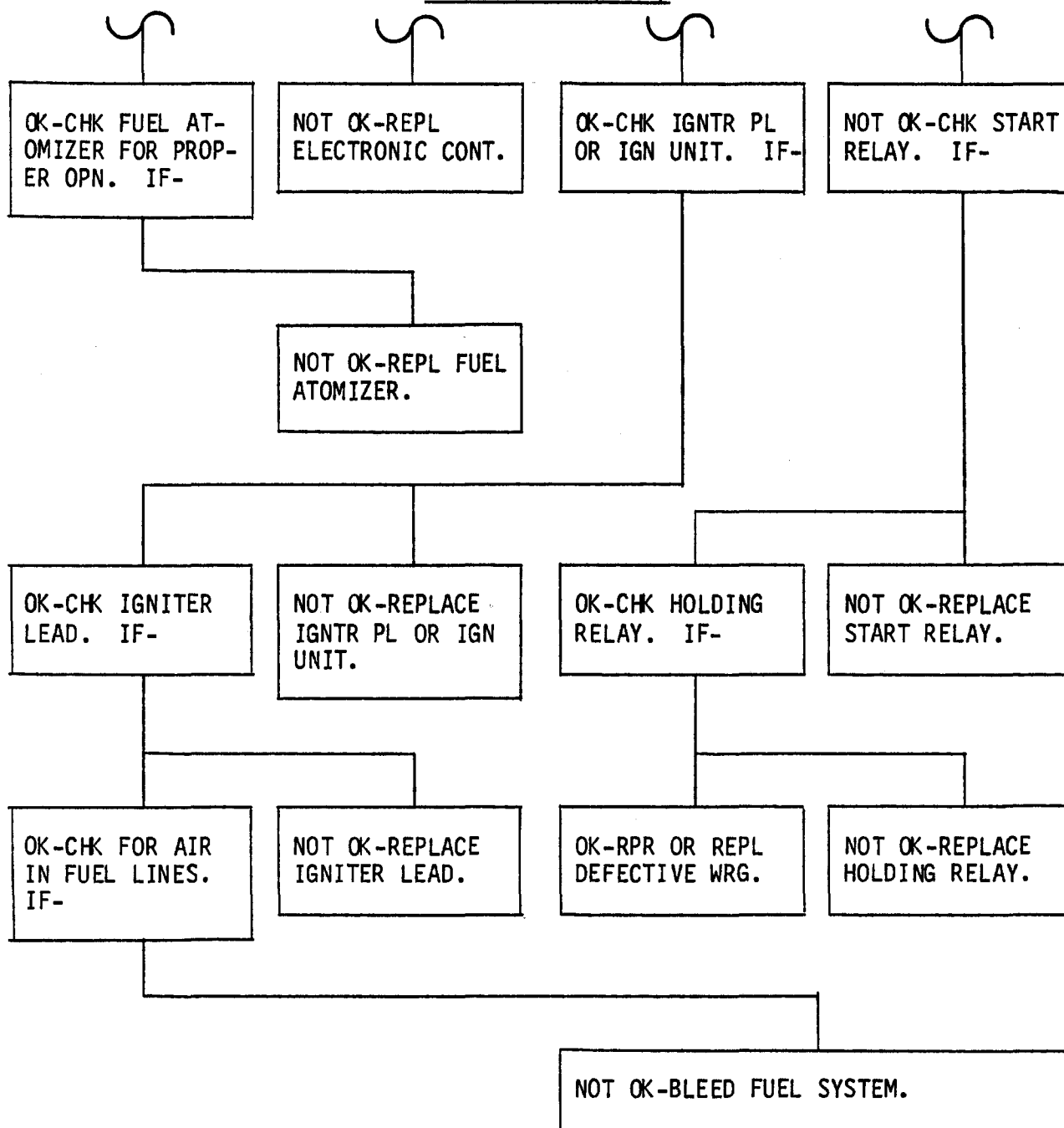
PROCEDURE 3





MAINTENANCE MANUAL
GTCP30-92C(A)

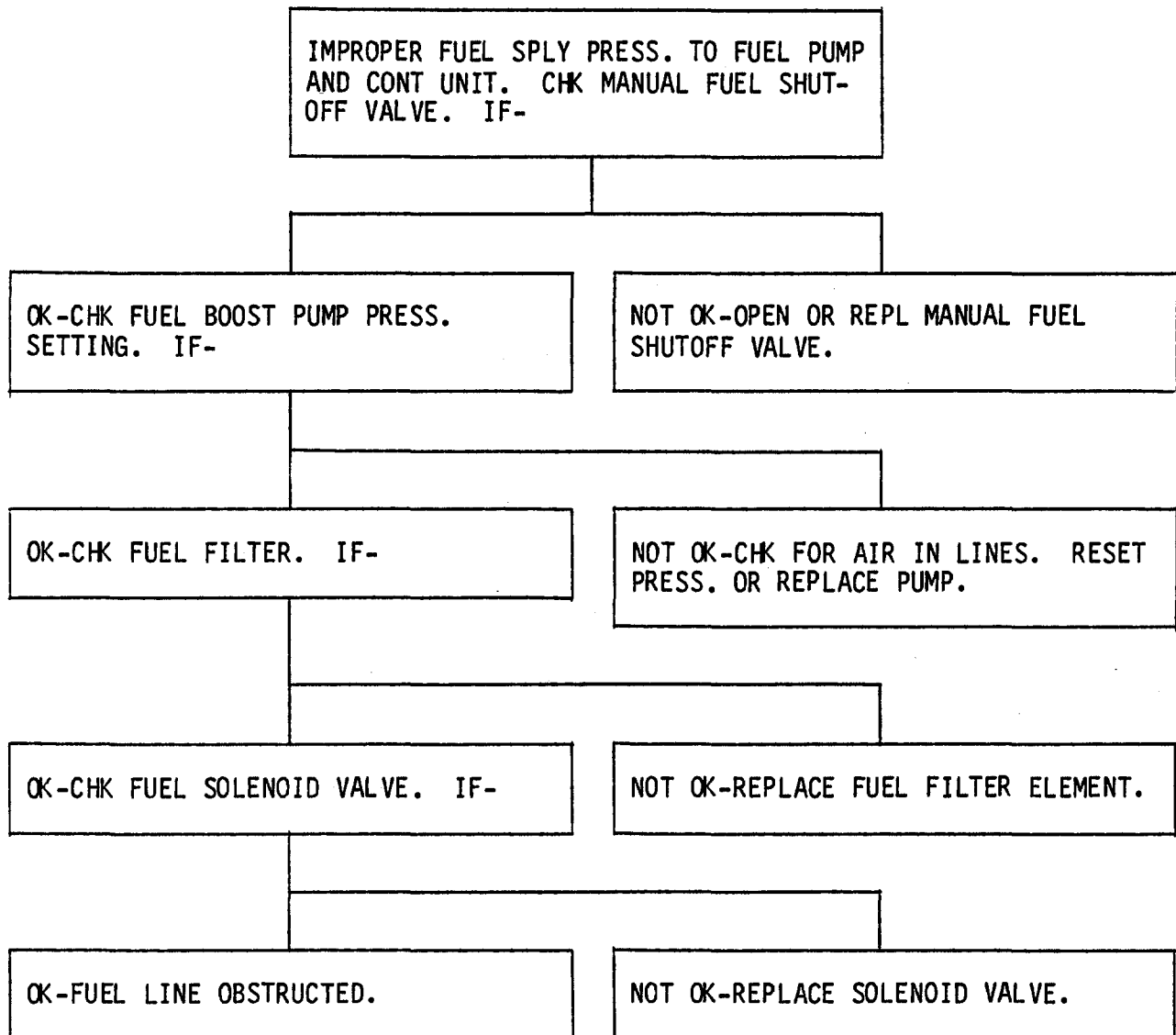
PROCEDURE 3 (CONT)





MAINTENANCE MANUAL
GTCP30-92C(A)

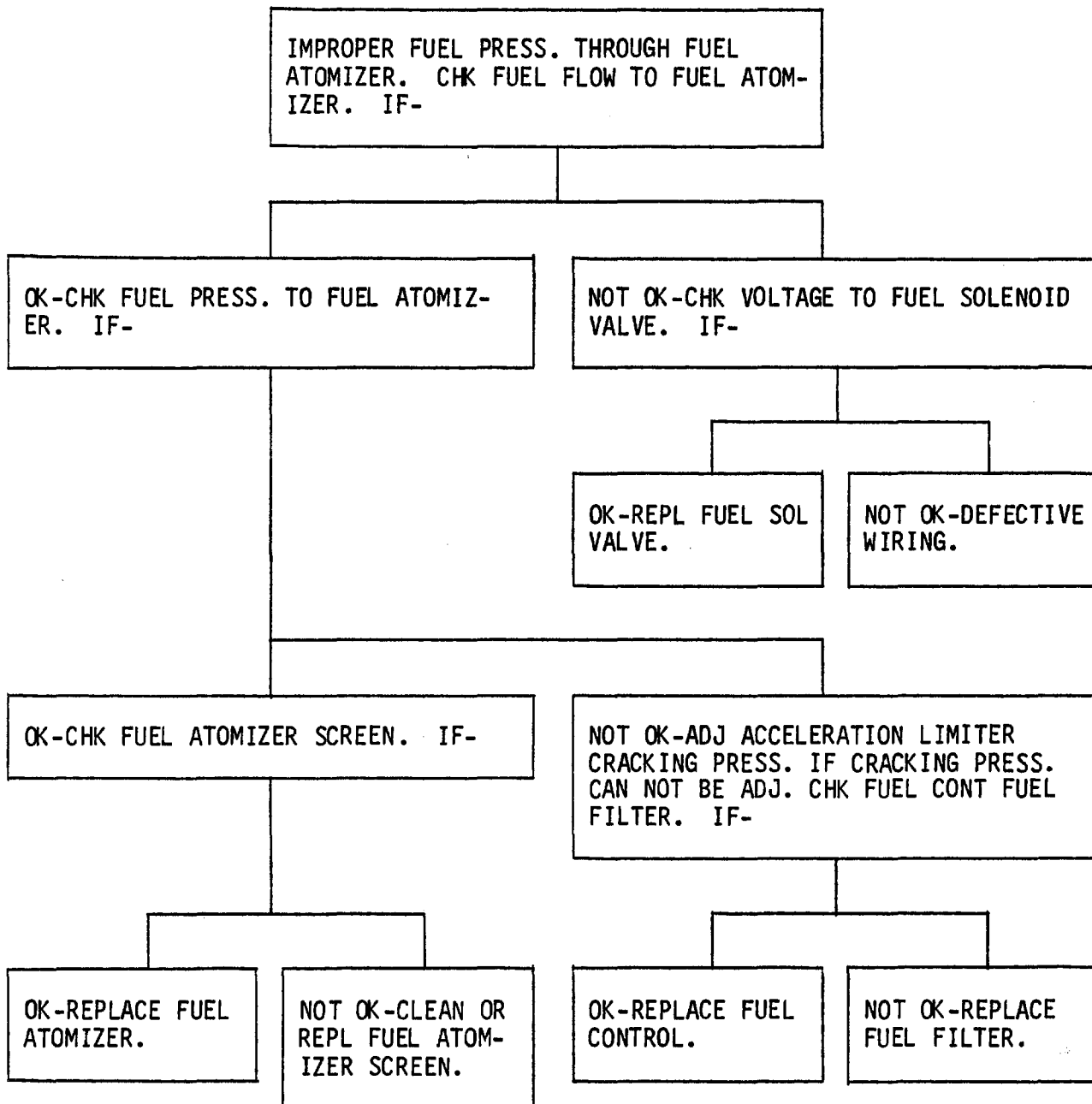
PROCEDURE 4





MAINTENANCE MANUAL
GTCP30-92C(A)

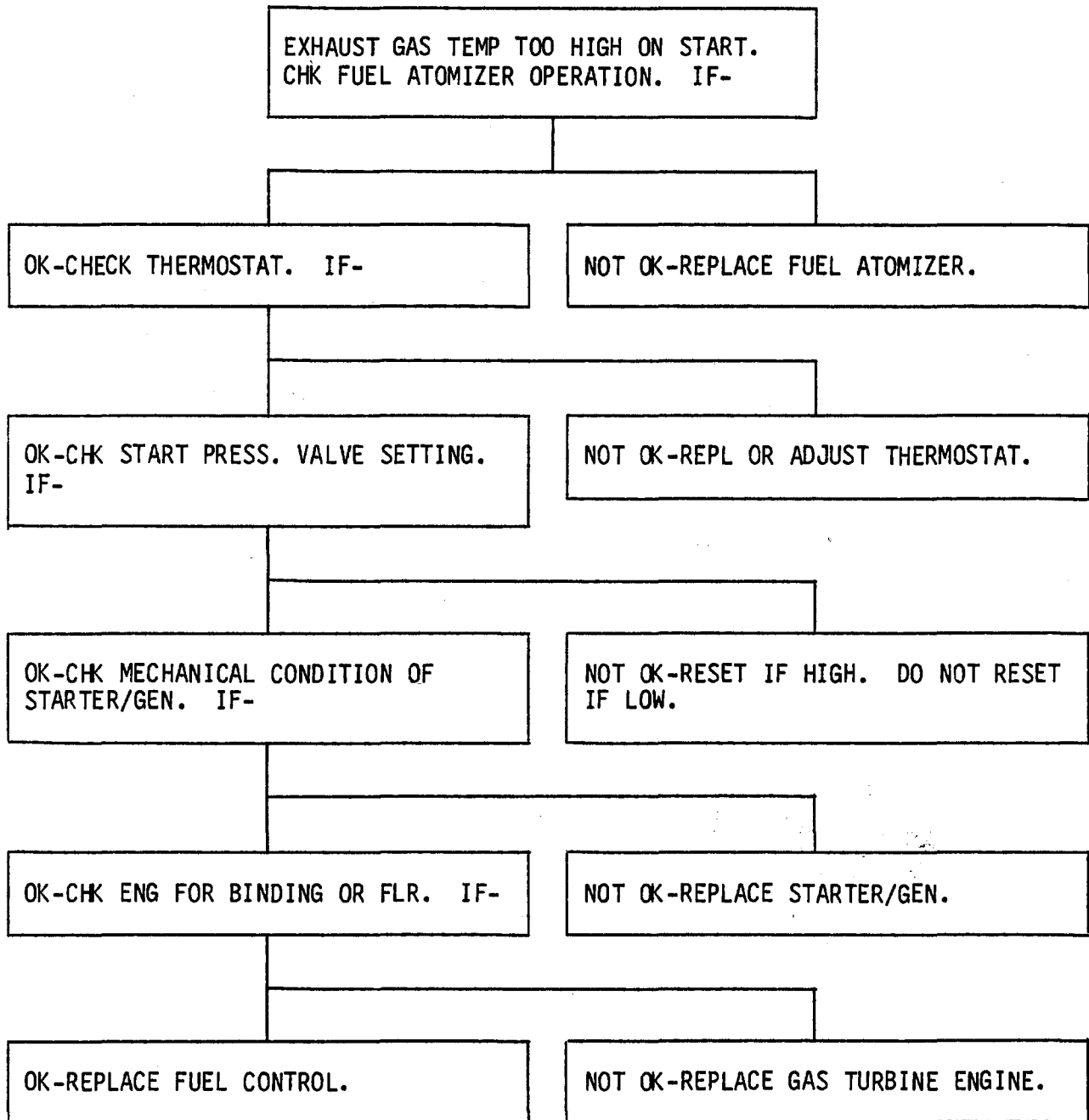
PROCEDURE 5





MAINTENANCE MANUAL
GTCP30-92C(A)

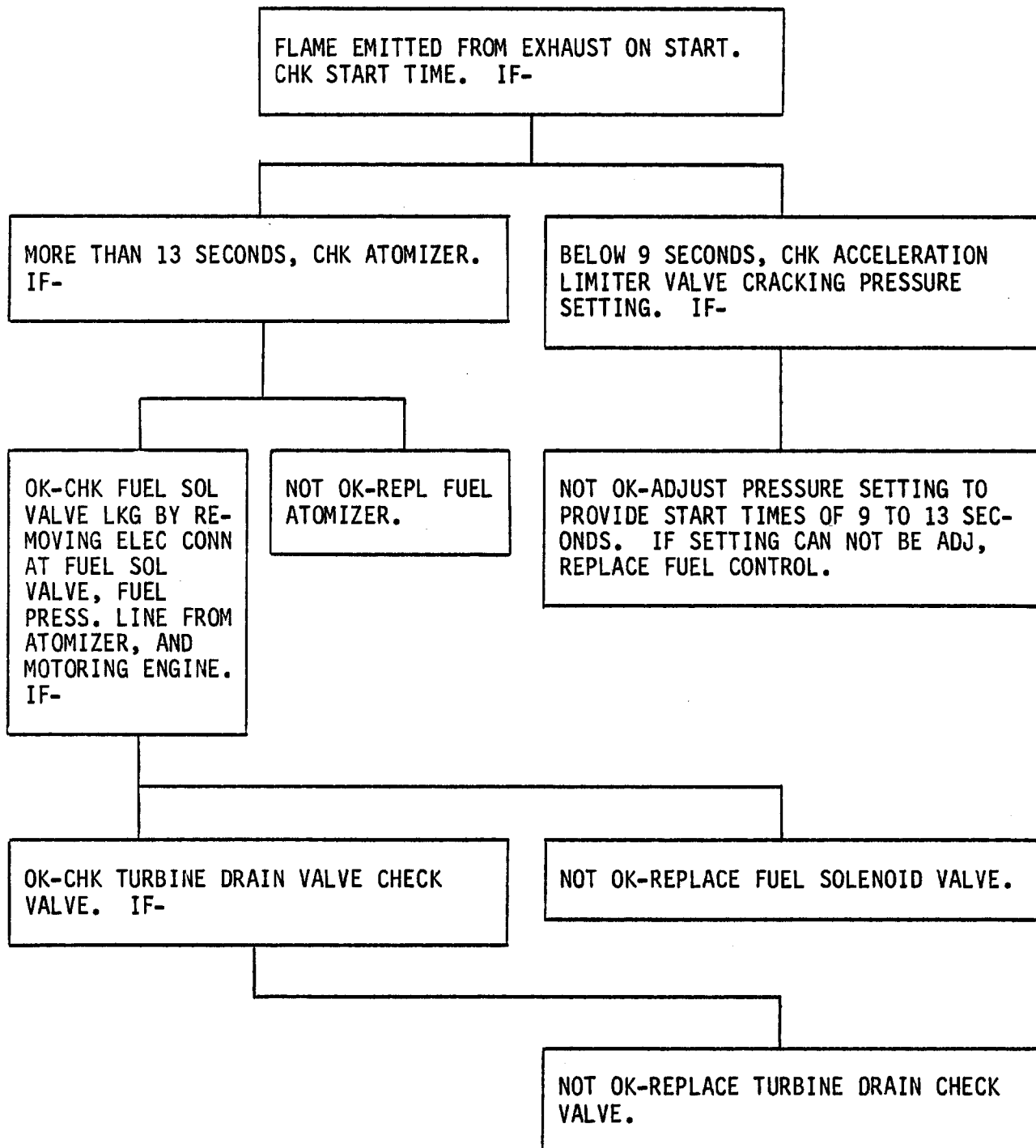
PROCEDURE 6





MAINTENANCE MANUAL
GTCP30-92C(A)

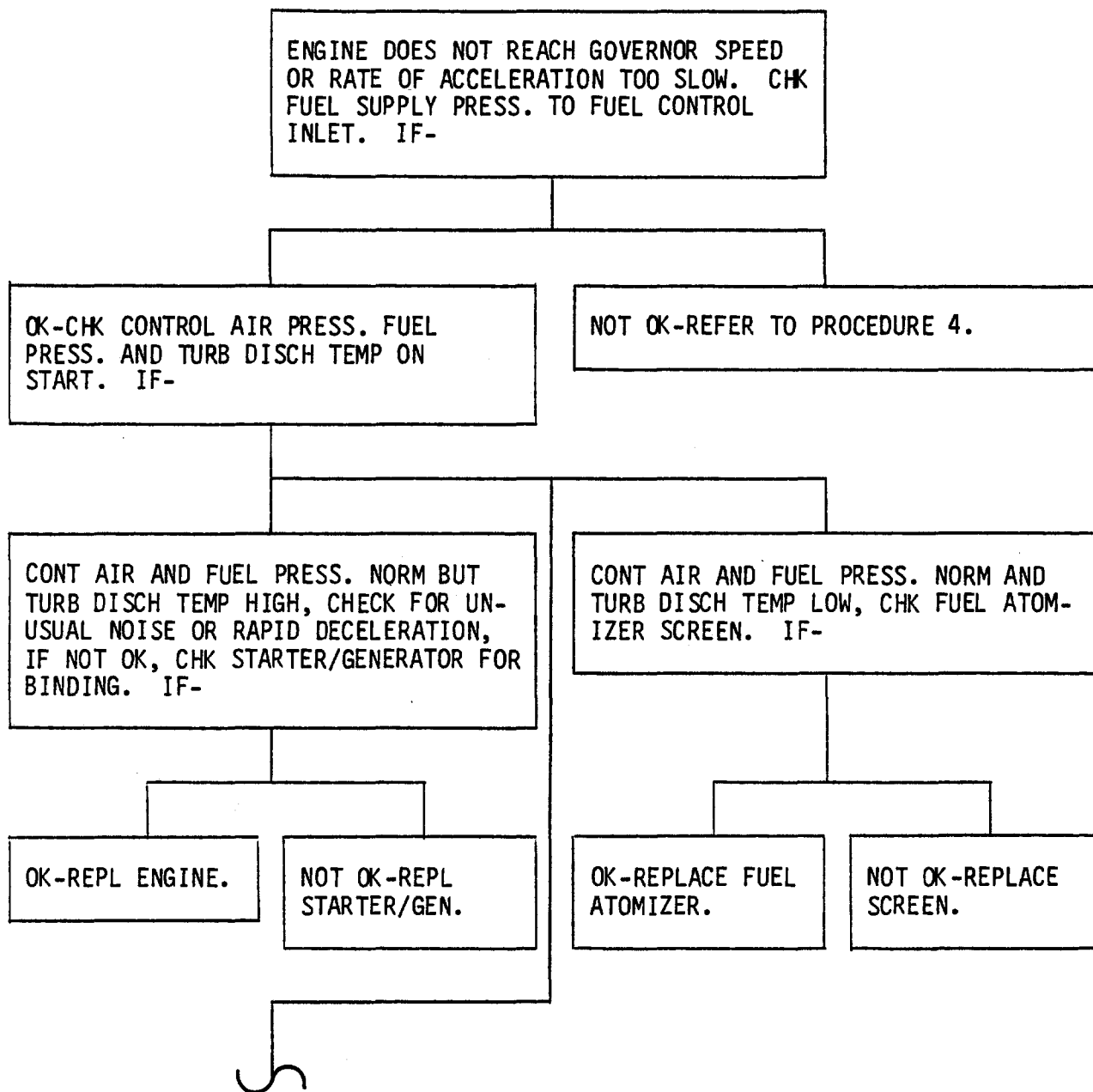
PROCEDURE 7





MAINTENANCE MANUAL
GTCP30-92C(A)

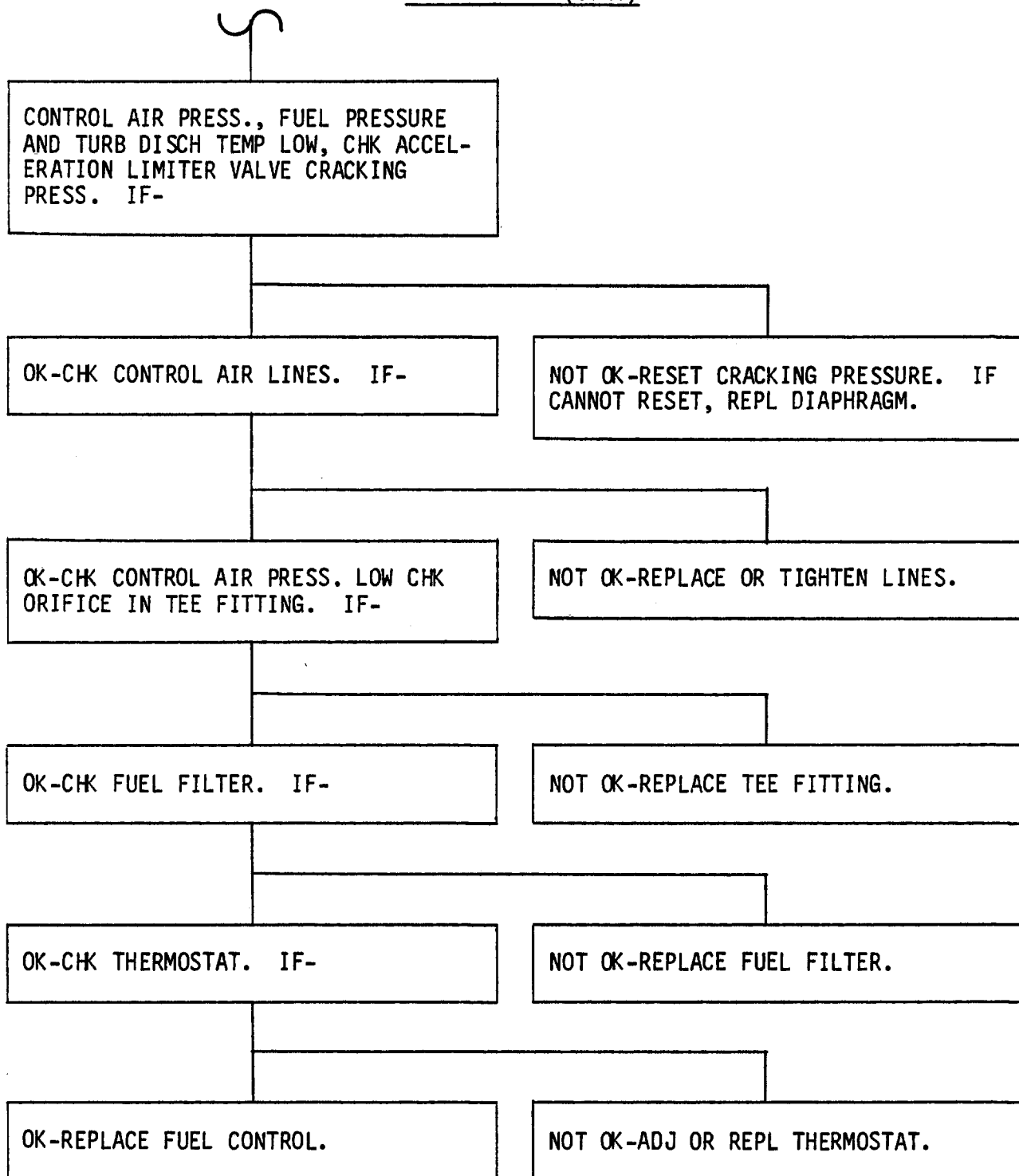
PROCEDURE 8





MAINTENANCE MANUAL
GTCP30-92C(A)

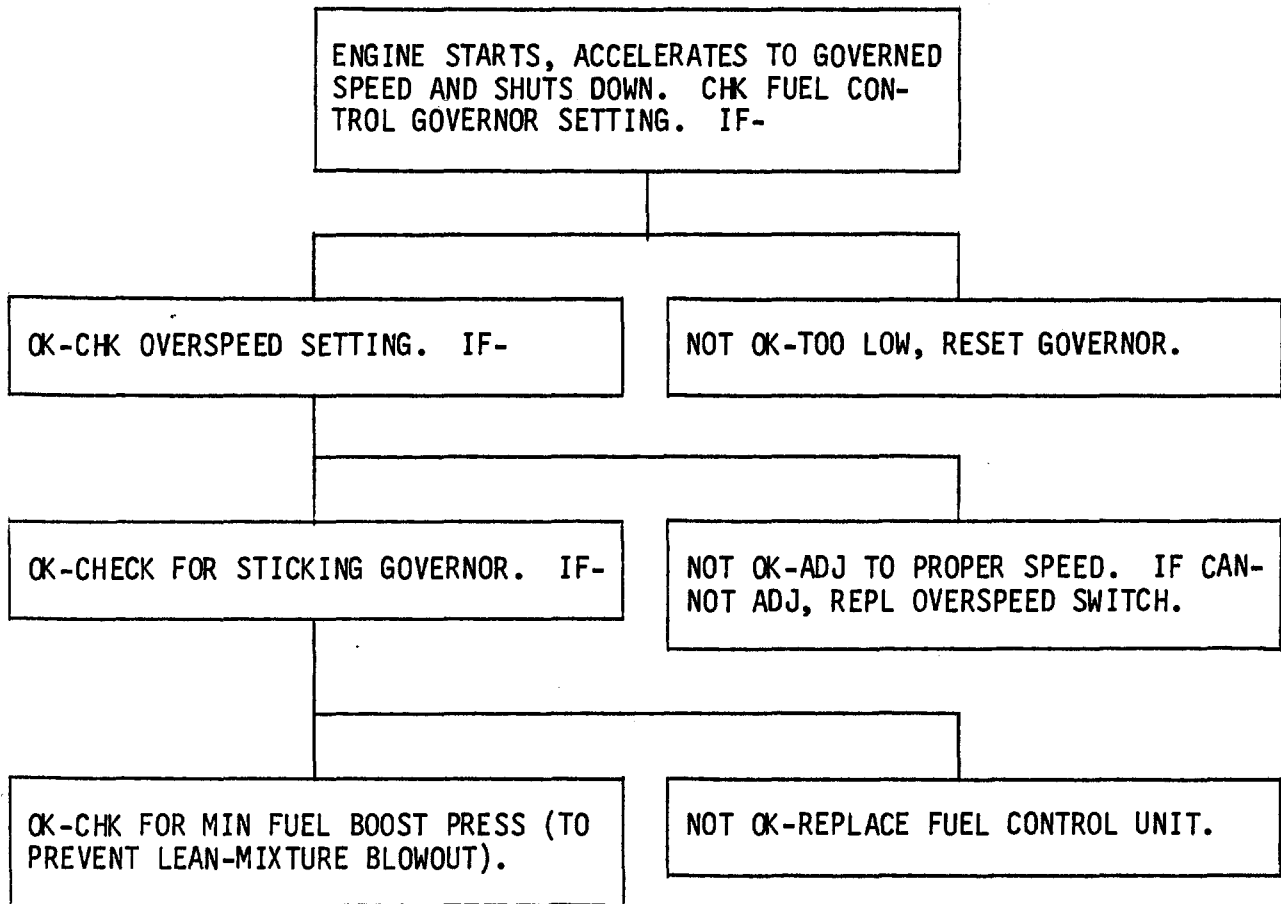
PROCEDURE 8 (CONT)





MAINTENANCE MANUAL
GTCP30-92C(A)

PROCEDURE 9





MAINTENANCE MANUAL
GTCP30-92C(A)

PROCEDURE 10

ENGINE OPERATES AT GOVERNED SPEED, BUT
ENGINE SPEED FLUCTUATES EXCESSIVELY.
CHK FUEL CONTAMINATION. IF-

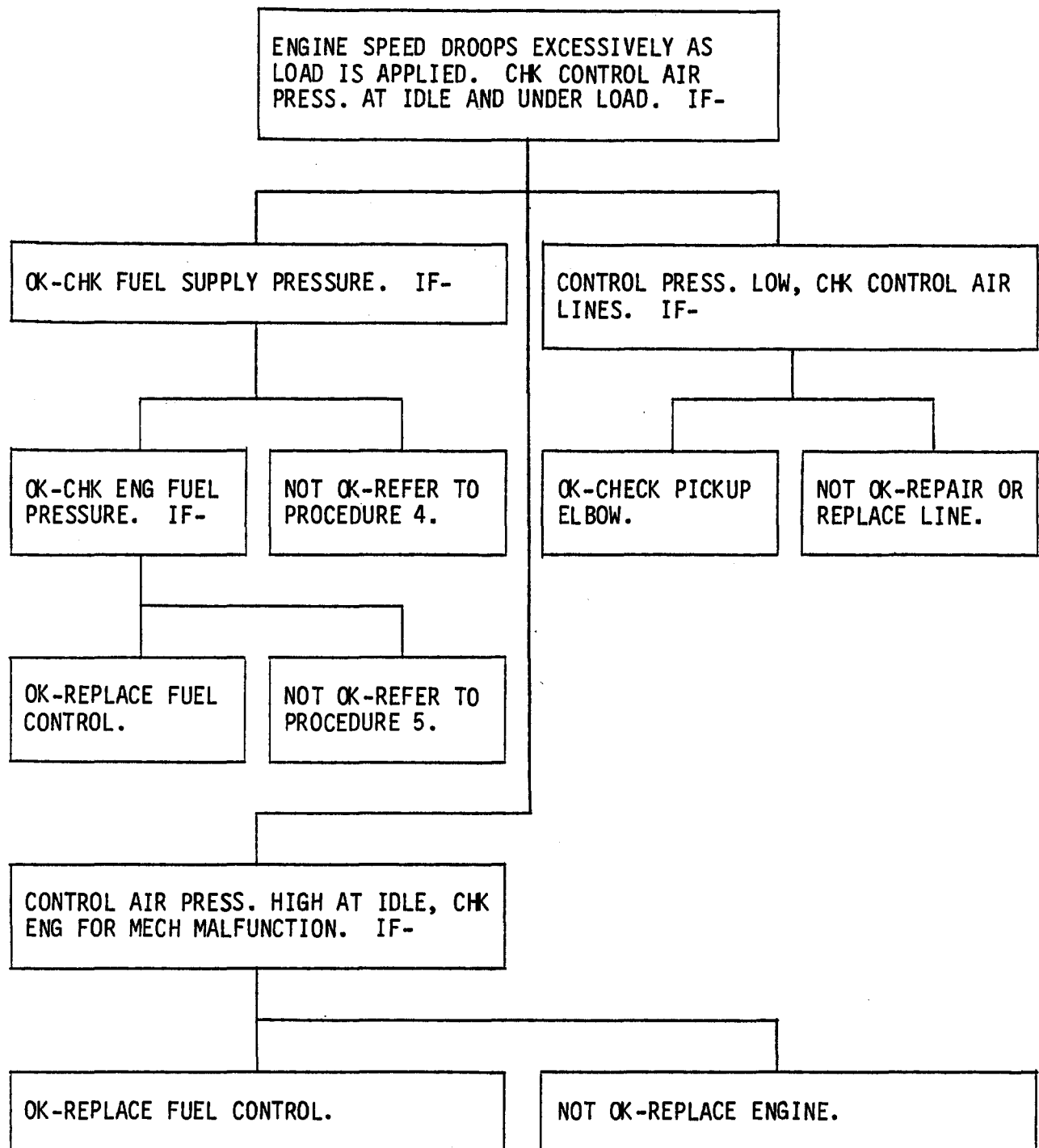
OK-REPLACE FUEL CONTROL.

NOT OK-REPLACE FILTERS.



MAINTENANCE MANUAL
GTCP30-92C(A)

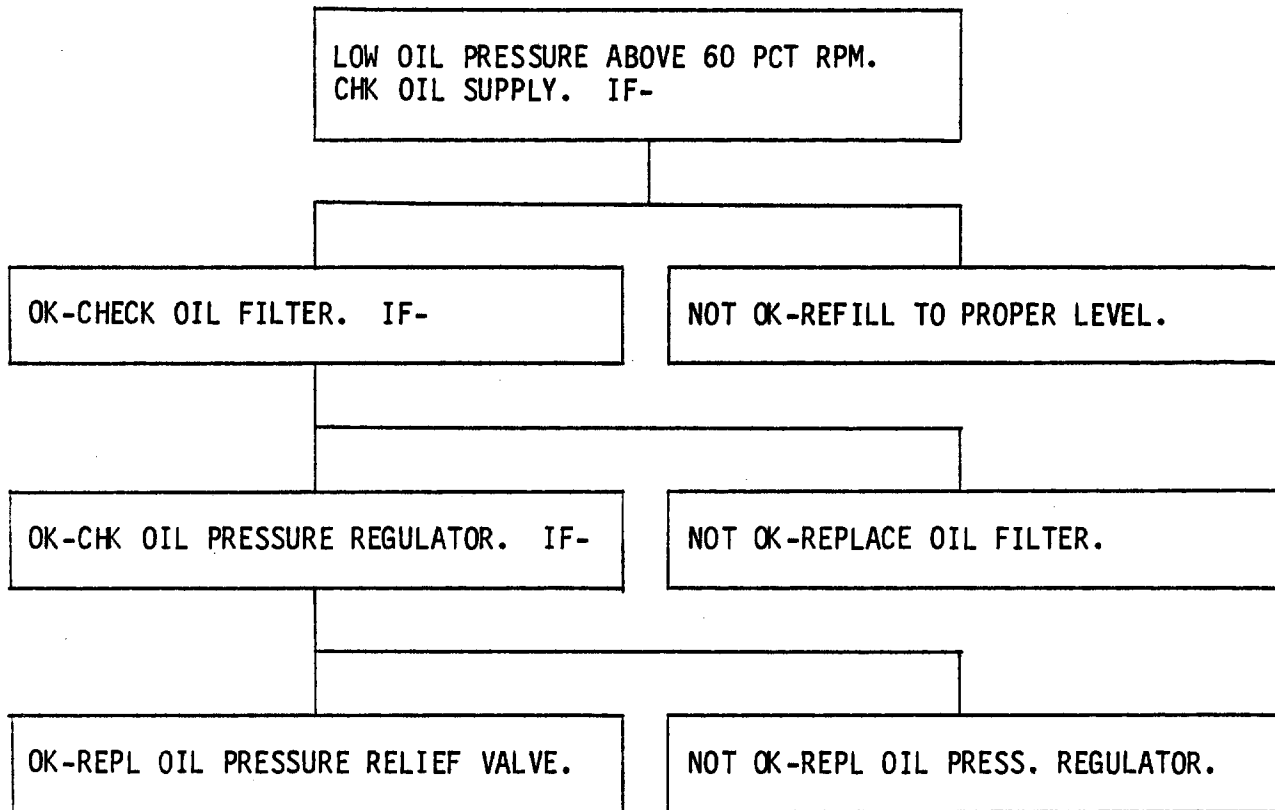
PROCEDURE 11





MAINTENANCE MANUAL
GTCP30-92C(A)

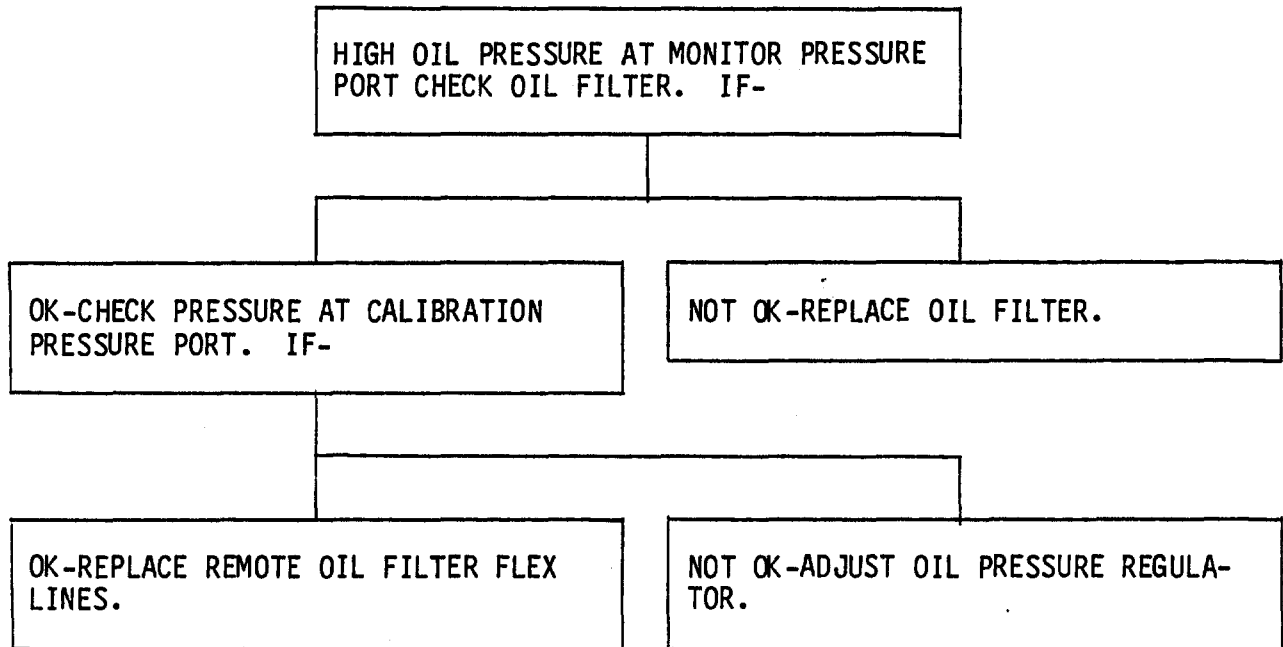
PROCEDURE 12





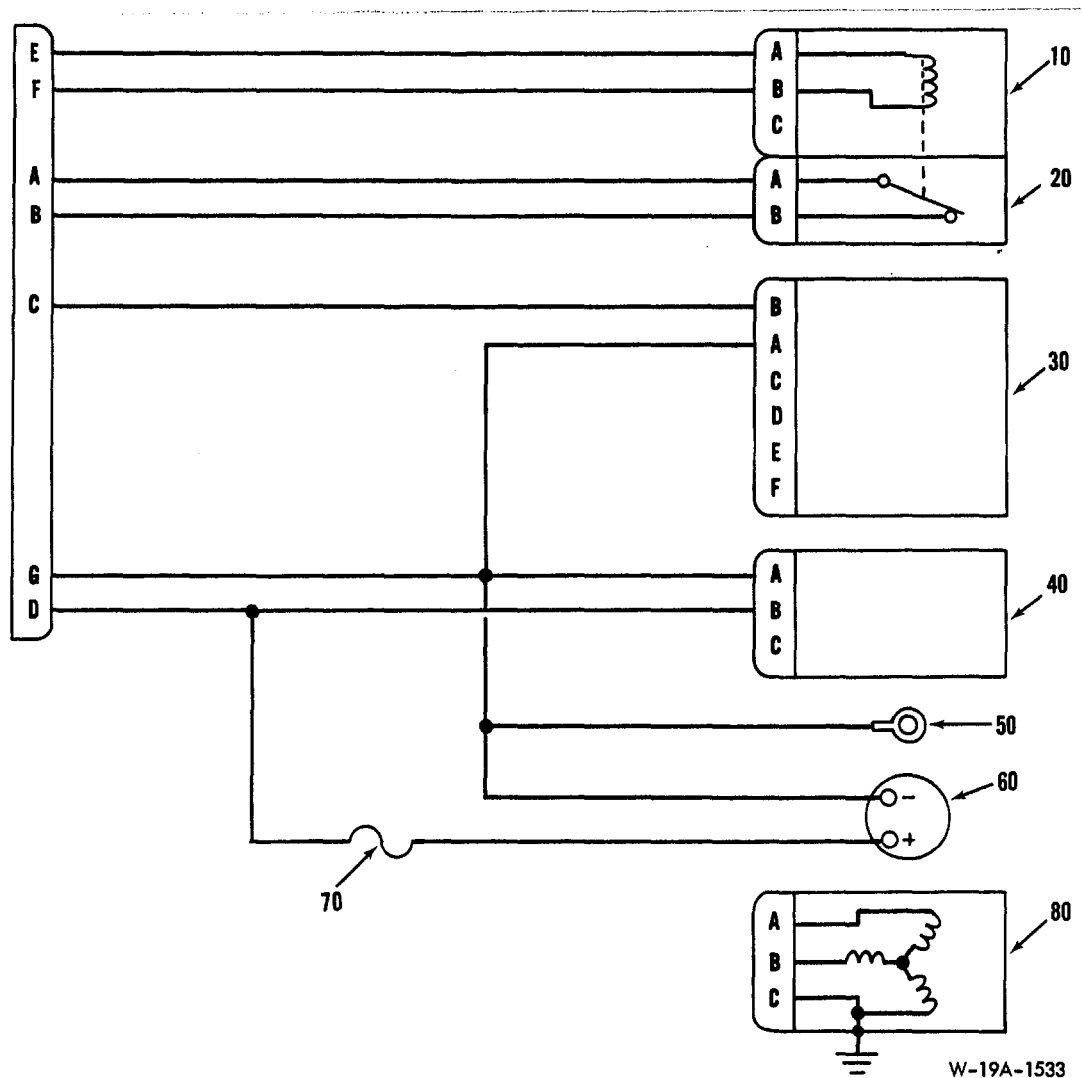
MAINTENANCE MANUAL
GTCP30-92C(A)

PROCEDURE 13





MAINTENANCE MANUAL
GTCP30-92C(A)



W-19A-1533

- 10. OVERSPEED TEST SOLENOID
- 20. OVERSPEED SWITCH
- 30. IGNITION UNIT
- 40. FUEL SHUTOFF VALVE

- 50. ENGINE GROUND
- 60. HOURMETER
- 70. FUSE
- 80. TACHOMETER/GENERATOR
(CUSTOMER FURNISHED)

Wiring Diagram
Figure 101

49-20-00
Page 122
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

ENGINE - SERVICING

1. Preparation for Use

Table 301. Materials and Compounds

Material or Compound	Manufacturer
----------------------	--------------

NOTE: Equivalent substitutes may be used for listed item.

Preserving oil (MIL-L-6081,
Grade 1005 or 1010)

Commercially available

A. Prepare a Newly Installed Engine for Use

NOTE: No depreservation procedures are required other than the normal preparation-for-use procedures.

- (1) Provide a source of fuel at pressure and of type specified in Table 1 to the fuel inlet connection port on the engine fuel control unit.
- (2) Provide a source of electrical power specified in Table 1 to the customer control panel installation.
- (3) Fill oil tank assembly to operating level with approved oil (MIL-L-7808 or MIL-L-23699). Allow time for oil level to recede as air is vented from gearcase assembly, then add oil until correct level is obtained. Reinstall gage rod assembly.
- (4) Service oil filter element in accordance with applicable instructions given in paragraph 3.C.
- (5) Bleed air from fuel control unit as follows.
 - (a) Disconnect fuel line from inlet port of fuel solenoid valve and arrange line to drain into a container.
 - (b) Turn boost pump on to supply fuel under slight pressure to the fuel control unit until all air is bled from unit and clear fuel is discharging from line into container.
 - (c) Reconnect fuel line to solenoid valve inlet port.

R



MAINTENANCE MANUAL
GTCP30-92C(A)

Table 302. Approved Engine Oils

Approved Lubrication Brand Name MIL-L-7808 or MIL-L-23699	Ambient Temperature	
	Minimum	Maximum
<u>3 Centistoke Oils</u>		
Aeroshell Turbine Oil 390	-54C (-65F)	54C (130F)
Brayco 880 Conojet	-54C (-65F)	54C (130F)
British Petroleum Aero Turbine Oil 15	-54C (-65F)	54C (130F)
Castrol 3C	-54C (-65F)	54C (130F)
Castrol 325	-54C (-65F)	54C (130F)
<u>5 Centistoke Oils</u>		
R Royco or Aeroshell Turbine Oil 500/555	-40C (-40F)	54C (130F)
R Castrol 5000	-40C (-40F)	54C (130F)
Exxon or Esso Turbine Oil 2380	-40C (-40F)	54C (130F)
R Hatcol 3611	-40C (-40F)	54C (130F)
R Mobil Jet II/254	-40C (-40F)	54C (130F)
Royco 899	-40C (-40F)	54C (130F)
<u>7.5 Centistoke Oils</u>		
Aeroshell Turbine Oil 750	-40C (-40F)	54C (130F)
Castrol 98	-40C (-40F)	54C (130F)

1. A. (6) Remove cap assembly from monitor pressure port (item 60, figure 1).

(7) Connect an oil line from a pre-oil boost pump serviced with same brand of oil as used to service oil sump in step (3). Apply approximately five psig pressure with boost pump, roll engine over by hand several times to ensure engine pre-oil. Remove pre-oil boost pump and replace cap assembly when engine pre-oil is assured.

R

B. Operate Engine and Check for Leakage After Engine Run

(1) Start engine. Allow engine to accelerate to no-load governed speed. Operate engine at no-load governed speed for three to five minutes to assure that internal parts of engine are properly lubricated.

(2) Stop engine. After engine has come to a complete stop, shut off fuel supply to engine fuel control unit.



MAINTENANCE MANUAL
GTCP30-92C(A)

1. B. (3) Carefully inspect all lubrication lines and fuel lines and their connection points for any evidence of oil leakage or fuel leakage. Correct if indicated. Re-establish fuel supply to fuel control unit. Engine is now ready for normal operation.

2. Preservation and Storage

If engine is installed in aircraft that will be out of service for periods up to 60 days, the engine should be operated at no-load governed speed for at least five minutes once every two weeks. The oil sump should be kept full of approved engine oil specified for the engine and all engine openings and exhaust doors should be closed, except when operating the unit, to prevent the entrance of water or foreign material.

CAUTION: DO NOT EXCEED CUSTOMER-FURNISHED STARTER DUTY CYCLE.

If the engine will be out of service for a period exceeding 60 days, preservation procedures must be performed as follows.

A. Preserve Engine

- (1) Observe applicable portions of MIL-E-5595 and MIL-E-5607.

CAUTION: DO NOT USE SPECIAL PRESERVATION OIL (MIL-C-8188 OR OTHER).

DO NOT SPRAY ANY OIL INTO COMPRESSOR INLET AS UN-CONTROLLED COMBUSTION UPON START COULD OCCUR.

- (2) Operate the engine for at least five minutes at no-load governed speed, shut down and preserve while the unit is still hot.
- (3) Disconnect and cap the fuel supply to the engine. This line should be left disconnected while the engine is inactive.
- (4) Disconnect the engine high pressure fuel line at the engine fuel solenoid valve or at the engine fuel atomizer assembly and connect a line to drain overboard.
- (5) Supply preserving oil (MIL-L-6081, Grade 1005 or 1010) to the engine fuel inlet port.
- (6) Motor the engine by means of the starter motor for 15 to 20 seconds or until the preserving oil is seen to come from the overboard drain line.
- (7) Reconnect the engine high pressure fuel line and cap the engine fuel inlet port.
- (8) Drain the preserving oils from the engine fuel and lubricating systems, including the oil sump. Allow the engine to stand until all of the preserving oils have drained, then reseal the systems.



MAINTENANCE MANUAL
GTCP30-92C(A)

R 2. A. (9) Deleted

- (10) Close the inlet and exhaust doors to prevent the entrance of water or foreign material.
- (11) Tag the engine as being a preserved engine not in operable condition.

NOTE: During in-place storage, the engine requires motoring once every thirty days. Motoring is accomplished by filling the engine oil sump with approved engine oil and motoring the engine for a total of 15 seconds by means of the engine starter motor. Care should be taken not to exceed the customer-furnished starter duty cycle. After the motoring is complete, the oil should be drained from the engine.

This preservation procedure may be renewed at the end of the first 120 days by repeating the steps outlined above. Engines still inactive at the end of the second 120 day period must be either placed in service or removed from the installation and preserved in sealed containers.

B. Perform Final Preparations for Storage if Engine is to be Removed from Aircraft

- (1) Disconnect all aircraft ducts, harness receptacles, and plumbing lines from engine.
- (2) Install plugs or caps, if indicated, at the following openings: fuel inlet port, accessory case pressure taps, fuel and oil pressure taps, fuel and oil drain fittings, and all other taps, ports, and openings on the engine.
- (3) Wipe all oil, fuel, or dirt from exterior of engine.
- (4) Install a suitable sling on engine and adjust as required to support engine in normal horizontal position.
- (5) Attach a hoisting hook or fork lift to sling and lift engine from customer installation.
- (6) Crate engine for shipment or storage in accordance with good practices.



MAINTENANCE MANUAL
GTCP30-92C(A)

3. Engine Lubrication System Service

Engine preserving oil and oil filter element shall be changed at intervals specified in Table 601.

A. Change Oil Having Same Specification and Brand

NOTE: Drain oil while engine is still hot from operation. If necessary, start and operate engine until oil reaches steady temperature, then shut down engine and proceed with oil change while oil is hot.

Loosen gage rod assembly to vent gearcase assembly and facilitate draining.

- (1) Remove plug from gearcase assembly and allow oil to drain completely into a container.
- (2) Carefully inspect drained oil for metal particles which might indicate internal damage to engine. If indicated, inspect engine to determine extent of damage and remedial procedures required.
- (3) When all oil has drained, clean plug and reinstall in tank.
- (4) Service oil filter element in accordance with applicable instructions given in Paragraph C.

R
R

NOTE: Oil level shall be checked and oil replenished as required after engine has been started and rotated sufficiently to indicate oil pressure.

- (5) Remove gage rod assembly and fill gearcase assembly with approved oil (table 302). Allow time for oil level to recede as air is vented from gearcase assembly, then add oil until correct level is obtained. Reinstall gage rod assembly.

B. Change Oil Having Different Specifications or Same Specification but Different Brand

NOTE: Drain oil while engine is still hot from operation. If necessary, start and operate engine until oil reaches steady temperature, then shut down engine and proceed with oil change while oil is hot.

- (1) Loosen gage rod assembly to vent gearcase assembly and facilitate draining. Remove drain plug at side of oil sump and allow oil to drain completely into a container.
- (2) Carefully inspect drained oil for metal particles which might indicate internal damage to engine. If indicated, inspect engine to determine extent of damage and remedial procedures required.
- (3) When oil has drained, clean plug and reinstall in oil sump.

R

R



MAINTENANCE MANUAL
GTCP30-92C(A)

- R 3. B. (4) Service oil filter element in accordance with applicable instructions given in paragraph C.
- R
- (5) Remove gage rod assembly and fill gearcase assembly with approved oil (Table 302). Allow time for oil level to recede as air is vented from gearcase assembly, then add oil until correct level is obtained. Reinstall gage rod assembly.
 - (6) Start and operate engine at no-load governed speed for approximately five minutes, then shut down engine.
 - (7) Drain oil immediately using procedures in accordance with steps (1) through (3).
 - (8) Service oil filter element, using procedures in accordance with paragraph C.
 - (9) Refill gearcase assembly with new oil, following procedures in accordance with step (5).
 - (10) Start and operate engine at no-load governed speed for approximately five minutes.

NOTE: Oil level shall be checked and oil replenished as required after engine has been started and rotated sufficiently to indicate oil pressure.

- (11) While engine is operating, monitor engine oil pressure indicated on a pressure gage installed at oil pressure tap for signs of unusually high or low oil pressure or fluctuating pressure. If oil pressure is abnormal, repeat oil change procedures as described in steps (1) through (6) above as often as required to obtain satisfactory steady state functioning of engine oil system.

C. Service Oil Filter Element

- (1) Remove oil filter element and packing from remotely located oil filter assembly. (Refer to Section 49-90-18, figure 201.)
- (2) Inspect element for excessive metal particles or foreign material that could indicate internal damage to engine.

NOTE: After installation of element, check engine oil supply and replenish if required.

- (3) Install new element and packing into remotely located oil filter assembly.

D. Check and Replenish Lubrication System Oil

- (1) Remove gage rod assembly from filler neck.



MAINTENANCE MANUAL
GTCP30-92C(A)

3. D. (2) Check level of oil on gage rod assembly.

CAUTION: ADD OIL OF SAME SPECIFICATION AND MANUFACTURER'S BRAND AS OIL ALREADY IN GEARCASE ASSEMBLY. DO NOT MIX OILS OF DIFFERENT SPECIFICATIONS OR BRANDS.

- (3) If oil is not visible on gage rod assembly, or is indicating low, add oil to fill gearcase assembly.

- (4) Reinstall and tighten gage rod assembly.

4. Engine Fuel System Service

A. Service Engine Fuel System

- (1) The engine fuel control unit fuel filter element shall be removed and replaced at intervals specified in Table 601 as follows. (Refer to Section 49-30-20, figures 201 and 202.)
 - (a) Shut off fuel supply to fuel control unit.
 - (b) Unscrew filter cap and remove cap, element, and packings from fuel control unit.
 - (c) Visually check element for excessive particles indicating possible contamination of fuel supply.
 - (d) Install new element, cap, and new packings onto fuel control unit.
 - (e) Re-establish fuel supply to fuel control unit.



MAINTENANCE MANUAL
GTCP30-92C(A)

ENGINE - REMOVAL/INSTALLATION

1. General

Remove and install engine components in accordance with the procedures outlined in the text and the individual exploded views. Obvious steps or procedures such as removal and installation of lockwire, attaching parts or simple components, are omitted from the text. Refer to the aircraft manual for procedures relative to removal and installation of the engine from the aircraft.

CAUTION: CARE MUST BE TAKEN IN HANDLING AND STORAGE OF APU'S INCORPORATING REMOTE FILTER INSTALLATIONS TO AVOID CRIMPING OR INTERNAL DAMAGE TO FLEX HOSES. CRIMPING OF THE LINES WILL CAUSE ERRONEOUS PRESSURE READINGS AND MAY CAUSE FILTER LOOP BYPASS.

Components of the plumbing and wiring installation may be removed and replaced as required. During removal, make note of the routing of tubing, hoses, and wiring harness and manner of attaching clamps for reference at reassembly. Tag plumbing fittings, lines, wiring harness connections and terminals as removed to aid at reinstallation.



MAINTENANCE MANUAL
GTCP30-92C(A)

ENGINE - ADJUSTMENT/TEST

1. General

CAUTION: WITH APU ENCLOSURE DOORS REMOVED, AIR FLOW MAY NOT BE SUFFICIENT TO PROPERLY COOL ENGINE OIL. A CHECK ON OIL TEMPERATURE SHALL BE MAINTAINED DURING ADJUSTMENT/TEST PROCEDURES.

The test and adjustment procedures described in this subject are limited to procedures which can be accomplished by personnel who operate and maintain the equipment in the field, and which can be performed without removal of the engine from the installation. Reference shall be made to the trouble shooting procedures one through thirteen.

2. Special Equipment

The special equipment required to perform tests described in this subject are listed in Table 501.

The Gas Turbine Engine Tester Part No. 290122-400 is a compact, portable unit designed to check and monitor operation of the engine in the aircraft installation. The tester incorporates instrumentation and connection for checking and/or measuring exhaust gas, engine rotor speed, fuel, oil, and control air pressures, and electrical circuit actuations. The tester includes four hose assemblies for connection of engine fuel, oil, and control air taps to the tester; these hose assemblies are normally stored in the tester cover. The tester and the tester instrument panel are shown in Figure 501.

Table 501. Special Tools, Fixtures and Equipment

Nomenclature	Use	Source/ Part No.
<u>NOTE:</u> Equivalent substitutes may be used for listed items.		
Gas Turbine Engine Tester	Used to accomplish rapid checkout of the gas turbine engine.	290122-400
Special Purpose Electrical Cable	Used to connect tester to gas turbine engine.	290392-1-1
Thermostat Calibration Test Set	To check calibration of gas turbine engine thermostats.	290417-5-1
Cable Assembly	Component of thermostat calibration test set.	290424-1



MAINTENANCE MANUAL
GTCP30-92C(A)

Table 501. Special Tools, Fixtures and Equipment (Cont)

Nomenclature	Use	Source/ Part No.
Thermocouple Assembly	Component of thermostat calibration test set.	290416-5
Wheatstone Bridge	Check resistance between indicator and exhaust gas thermocouple.	Model 4289-2, Leads and Northrup, North Whales, PA 19454 or equivalent.

The tester also includes a separate boxed pressure gage, and case set, which are normally stored in the tester cover, and are used for checking fuel control unit acceleration limiter valve cracking pressure.

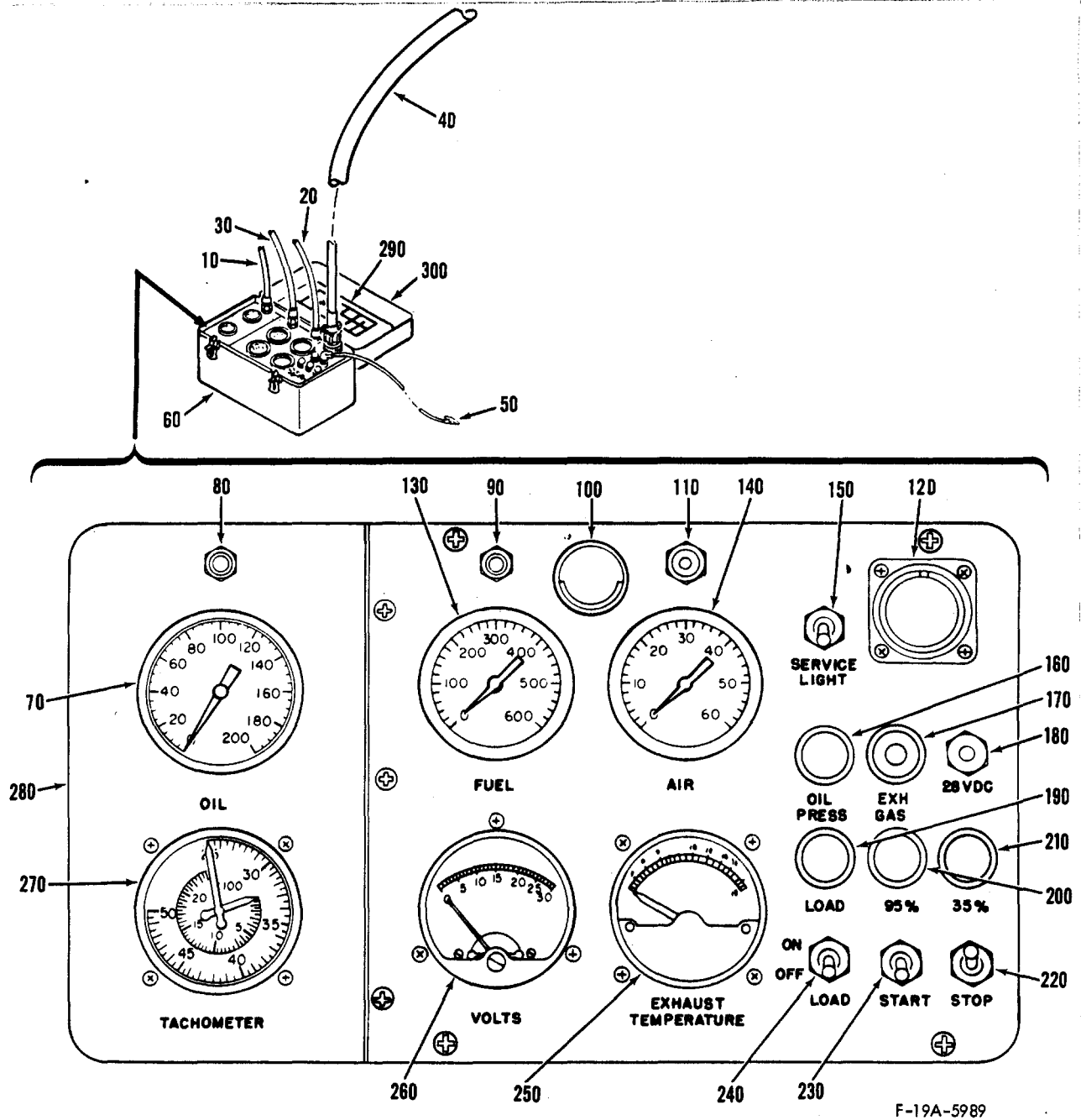
The Special Purpose Electrical Cable Part No. 290392-1-1 provides for the necessary interconnection of engine circuits, installation circuits, and tester circuits. The cable is shown in Figure 501.

KEY TO FIGURE 501

- | | |
|--|---|
| 10. OIL PRESSURE HOSE ASSEMBLY | 160. OIL PRESSURE SWITCH LIGHT (RED) (NOT USED) |
| 20. CONTROL AIR PRESSURE HOSE ASSEMBLY | 170. EXHAUST GAS TRANSFER SWITCH |
| 30. FUEL PRESSURE HOSE ASSEMBLY. | 180. 28 VDC JACK |
| 40. CABLE ASSEMBLY (PART NO. 290392-1-1) | 190. LOAD LIGHT (GREEN) (NOT USED) |
| 50. 28 VDC POWER SUPPLY LEAD | 200. 95-PERCENT SWITCH LIGHT (NOT USED) |
| 60. 290122-400 SERIES 1 TESTER | 210. 35-PERCENT SWITCH LIGHT (NOT USED) |
| 70. OIL PRESSURE GAGE | 220. STOP SWITCH |
| 80. OIL PRESSURE COUPLING | 230. START SWITCH |
| 90. FUEL PRESSURE COUPLING | 240. LOAD SWITCH (NOT USED) |
| 100. PANEL LIGHT | 250. EXHAUST TEMPERATURE INDICATOR |
| 110. CONTROL AIR PRESSURE COUPLING | 260. DC VOLTMETER |
| 120. RECEPTACLE | 270. TACHOMETER INDICATOR |
| 130. FUEL PRESSURE INDICATOR | 280. INSTRUMENT PANEL |
| 140. CONTROL AIR PRESSURE (OR LOW FUEL PRESSURE) INDICATOR | 290. DECAL (ELECTRICAL SCHEMATIC) |
| 150. SERVICE LIGHT SWITCH | 300. TESTER CASE |



MAINTENANCE MANUAL GTCP30-92C(A)



Gas Turbine Engine Tester PN 290122-400
Figure 501



MAINTENANCE MANUAL
GTCP30-92C(A)

The Thermostat Calibration Test Set Part No. 290417-5-1, Cable Assembly Part No. 290424-1, and Thermocouple Assembly Part No. 290416-5 provide for precision exhaust gas temperature readings used for more accurate calibration of the overtemperature control thermostat.

3. Equipment Connections

A. Connect Equipment

- (1) Connect oil pressure hose assembly (10) to oil pressure coupling (80). Connect other end of oil pressure hose assembly to the calibration pressure port on engine. (See figure 1, Section 49-20-00, OPERATION.)
- (2) Connect control air pressure hose assembly (20, figure 501) to control air pressure coupling (110). Connect other end of control air pressure hose assembly to control air pressure port on engine.
- (3) Connect fuel pressure hose assembly (30) to fuel pressure coupling (90). Connect other end of fuel pressure hose assembly to fuel pressure port on engine.
- (4) Connect end of cable assembly (40), marked TESTER to receptacle (120). Connect end of cable assembly, marked AIRCRAFT to aircraft connector. Connect end of cable assembly marked ENGINE to engine receptacle, removed from aircraft connector.
- (5) Connect 28 VDC power supply lead (50) to 28 VDC jack (180). Connect other end of 28 VDC power supply lead to a source of 28 VDC power.
- (6) Install Thermostat Calibration Test Set Part No. 290417-5-1 as follows.
 - (a) Remove engine thermocouple and install Thermocouple Assembly Part No. 290416-5 with exposed beads facing into exhaust stream. Use Cable Assembly Part No. 290424-1 to connect thermocouple assembly and Thermostat Calibration Test Set Part No. 290417-5-1.

4. Precautionary Requirements

A. Observe Precautionary Requirements

CAUTION: PRECAUTIONS SHALL BE TAKEN TO ENSURE AGAINST INGESTION OF WATER AND DE-ICING FLUID BY AN OPERATING APU DURING WASHING OR DE-ICING OF AIRCRAFT. INGESTION OF WATER OR DE-ICING FLUIDS MAY RESULT IN SEVERE ENGINE DAMAGE.

- (1) Shut down engine at once and correct trouble if any of the following conditions occur.

TEMPORARY REVISION NO. 49-9

To holders of Pneumatic and Shaft Power Gas Turbine Engine Maintenance Manual Report No. 49-23-23, Revision 1, dated May 11, 1987. Insert facing page 505, 49-20-00.

Reason: To add equivalent turbine rotor speeds in percent.

Turbine Wheel Speeds and Overspeed Switch Actuation in Table 502 are revised to read as follows.

Table 502. Operating Limits

Observation	Condition	Limit Requirements
Turbine Wheel Speeds	No-load governed speed	60,200 rpm (102 percent)
	Full-load governed speed	59,000 $\pm$ 200 rpm (100 $\pm$ 0.3 percent)
	Allowable variation at steady-state operation	$\pm$ 200 rpm ($\pm$ 0.3 percent)
Overspeed Switch Actuation		63,130 to 64,900 rpm (107 to 110 percent)



MAINTENANCE MANUAL
GTCP30-92C(A)

4. A. (1) (a) No oil pressure within ten seconds after start.
- (b) Ignition failure (flameout).
- (c) Oil pressure is other than 30 to 40 psig above 30,000 rpm.
- (d) Exhaust gas temperature exceeds $688 \pm 5C$ ($1270 \pm 10F$).
- (e) Engine rotor speed exceeds 110 percent.
- (2) Observe operating limits in Table 502 during all test procedures.

Table 502. Operating Limits

Observation	Condition	Limit Requirements
CAUTION: STOP UNIT IF INDICATED VALUES EXCEED OR PERSIST AT THESE LIMITS.		
Inlet Air Temperature	Never exceed	55C (130F) maximum
Exhaust Gas Temperature	Sustained operation	649 $\pm 5C$ (1200 $\pm 10F$) maximum
	Maximum allowable transient during start.	455C (850F)
	Maximum allowable (Never exceed)	688 $\pm 5C$ (1270 $\pm 10F$)
*Turbine Wheel Speeds	Sustained operation (No-load)	60,200 rpm
	Allowable variation at steady-state operation.	± 200 rpm
Overspeed Switch Actuation		63,130 to 64,900 rpm
Oil Pressure (at operating temperature) (at calibration port)	Except below 30,000 rpm	35 ± 1.0 psig

R
R
R





MAINTENANCE MANUAL
GTCP30-92C(A)

Table 502. Operating Limits (Cont)

Observation	Condition	Limit Requirements
Oil Pressure (at operating temperature) (at monitor pressure port)	Except below 30,000 rpm	35 to 45 psig
Oil Pressure Fluctuation	Steady-state operation	±2 psig maximum
*CAUTION: DO NOT ALLOW TURBINE WHEEL SPEEDS TO DWELL AT ANY SPEED WHERE VIBRATION EXCEEDS 0.3 MIL.		
Light-off Time	Maximum	5 seconds
Acceleration Time (Ignition to governed speed)		9 to 13 seconds

5. Operation Checks and Adjustments

A. Perform Operation Checks and Adjustments

- (1) Prime engine lubricating system not previously primed, any time during test that oil filter is changed or oil pump loses its prime, following procedure shall apply.
 - (a) Fill gearcase assembly to FULL mark on gage rod assembly.
 - (b) Remove electrical connector from fuel solenoid valve. Do not replace connector until so instructed in step (e).

TEMPORARY REVISION NO. 49-10

To holders of Pneumatic and Shaft Power Gas Turbine Engine Maintenance Manual Report No. 49-23-23, Revision 1, dated May 11, 1987. Insert facing page 507, 49-20-00.

Reason: To clarify and improve the adjustment procedures for the start pressure valve.

Paragraph 5.A.(3) is revised to read as follows.

5. A. (3) Adjust start pressure (acceleration limiter) valve.

NOTE: Adjustment of start pressure valves is required when there is evidence of torching, start time is less than 9 seconds, start time exceeds 13 seconds or engine hangs up. If adjustment is necessary, make certain all air is bled from fuel control unit and ensure that adequate fuel boost pressure (5 to 20 psig) is available.

- (a) Disconnect hose assembly from atomizer and install pressure gage (0 to 200 psi) to hose assembly. Disconnect control air pressure line.

CAUTION: DO NOT EXCEED MANUFACTURER'S RECOMMENDED STARTER DUTY CYCLE.

- (b) Energize starter to free running speed and note cracking pressure at motoring speed. Cracking pressure shall be 55 ±5 psig.

- (c) If pressure is not within limits stated, adjust as follows:

CAUTION: LOOSEN LOCKNUT ONLY SUFFICIENTLY TO MAKE ADJUSTMENT OR ADJUSTMENT NUT WILL SEPARATE FROM PIN IN COVER AND ADJUSTMENT WILL NOT BE POSSIBLE.

Loosen locknut and adjust acceleration limiter adjusting screw (12, Figure 201, Section 49-30-20). Clockwise movement will increase pressure; counterclockwise movement will decrease pressure. Repeat steps (b) and (c) until required setting is obtained.

- (d) Reinstall hose assembly to fuel atomizer and reconnect control air pressure line.
- (e) In the event that adjustment of the acceleration limiter does not correct problems of fast starts and/or torching, contact nearest Garrett Field Service Engineer or an authorized Garrett APU Service Center for a possible start control system modification.



MAINTENANCE MANUAL
GTCP30-92C(A)

5. A. (1) (c) Depress start switch and motor engine until oil pressure is indicated. If no oil pressure is indicated within 30 seconds, shut down and eliminate cause, if possible. Otherwise, reject engine.

R

- (d) Deleted
(e) Reconnect fuel solenoid valve electrical connector.

- (2) Accomplish fuel prime when fuel supply has been connected to unit.

- (a) Disconnect fuel pressure hose from atomizer and provide a suitable container for fuel drain.
(b) Motor engine until a clear, steady stream of fuel is discharged from fuel pressure hose.
(c) Reconnect fuel pressure hose to atomizer.

- (3) Adjust start pressure (acceleration limiter) valve.

NOTE: Adjustment of start pressure valves is required when there is evidence of torching, start time is less than 9 seconds, start time exceeds 13 seconds or engine hangs up. If adjustment is necessary, make certain all air is bled from fuel control unit and ensure that adequate fuel boost pressure (5 to 20 psig) is available.

- (a) Disconnect hose assembly from atomizer and install pressure gage (0 to 200 psi) to hose assembly. Disconnect control air pressure line.
(b) Energize starter to free running speed and note cracking pressure at motoring speed. At approximately 15000 rpm (25 percent), cracking pressure shall be 65 to 70 psig.

CAUTION: DO NOT EXCEED MANUFACTURER'S RECOMMENDED STARTER DUTY CYCLE.

R

- (c) If pressure is not within limits stated, adjust as follows:

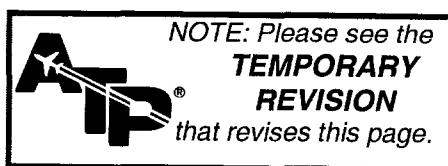
Loosen locknut and adjust acceleration limiter adjusting screw (12, figure 201, Section 49-30-20). Clockwise movement will increase pressure; counterclockwise movement will decrease pressure.

R

R

CAUTION: LOOSEN LOCKNUT ONLY SUFFICIENTLY TO MAKE ADJUSTMENT.

- (d) Reinstall hose assembly to fuel atomizer and reconnect control air pressure line.



49-20-00
Page 507
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

5. A. (4) Prior to use of Gas Turbine Engine Tester Part No. 290122-400, check exhaust temperature electrical loop resistance as follows.
- (a) Remove tester panel attaching screws and lift panel to obtain access to temperature indicating circuit components.
 - (b) Tag and disconnect lead wires from exhaust temperature indicator terminals on rear of indicator to remove indicator from loop.
 - (c) Using Model 4289-2 Wheatstone Bridge, check total resistance of circuit between (and external too) indicator (25, figure 501) and exhaust temperature thermocouple. Electrical resistance of the circuit excluding indicator shall be 8.000 ± 0.035 ohms. If total resistance is not within specified limit, adjust slide of variable resistor in tester set to obtain correct resistance.
 - (d) Remove Wheatstone Bridge, reconnect lead wires, and replace panel of tester using previously removed screws.
- (5) Check engine start, acceleration, operation, and automatic controls actuation. (See figure 501.)

CAUTION: OBSERVE ALL REQUIREMENTS SPECIFIED IN PRECAUTIONARY REQUIREMENTS. IF ENGINE DOES NOT PERFORM SATISFACTORILY AS INDICATED IN THE FOLLOWING STEPS, STOP ENGINE AND CORRECT TROUBLE BEFORE PROCEEDING.

- (a) Connect Gas Turbine Engine Tester Part No. 290122-400 to engine and installation as outlined in Equipment Connections. Place all tester switches in de-energized position.

NOTE: Check aircraft manual for required procedures to place aircraft equipment and systems in safe and operable condition.

- (b) Actuate tester panel service light switch (150) to provide illumination from panel light (100), if required.
- (c) Place START switch (230) in ON position.



MAINTENANCE MANUAL
GTCP30-92C(A)

NOTE: Start and operate engine in accordance with standard operating procedures. Observe following indications on tester. If no-load governed speed is not as specified in Table 502, adjust governor setting in accordance with paragraph 5.A.(6). If acceleration time is not as specified in Table 502, adjust start fuel valve (acceleration limiter) in accordance with paragraph 5.A.(3).

5. A. (5) (d) Engine shall start and accelerate to no-load governed speed indicated on tachometer indicator (270, figure 501) in time specified in Table 502.
- (e) Observe oil pressure indication on oil pressure indicator (70) on starting and within limits specified in Table 502.
- (f) Observe exhaust gas temperature indicated on exhaust temperature indicator (250) within limits specified in Table 502.
- (g) Record engine rpm, exhaust gas temperature and oil pressure as indicated on tester instruments.
- (h) Apply load to engine in accordance with aircraft operational procedures. Observe exhaust gas temperature indicated on exhaust temperature indicator (250), and rpm stabilizes within limits specified in Table 502.
- (i) Remove load from engine and allow exhaust gas temperature indicated on exhaust temperature indicator (250) to stabilize for a minimum of two minutes.
- (j) Stop engine by operating stop switch on tester panel.
- (6) Adjust fuel control governor.

NOTE: Adjustment of the fuel control governor is not required unless engine no-load governed speed is other than that specified in Table 502.

- (a) Start gas turbine engine, hold fuel control governor adjustment screw (110, figure 201, Section 49-30-20), break lockwire and loosen hex nut which locks screw.
- (b) Turn adjustment screw until tachometer on APU control panel indicates 102 percent no-load RPM. Turn screw clockwise to increase governed speed; counterclockwise to decrease speed.
- (c) Hold screw position, tighten locknut and lockwire.



MAINTENANCE MANUAL
GTCP30-92C(A)

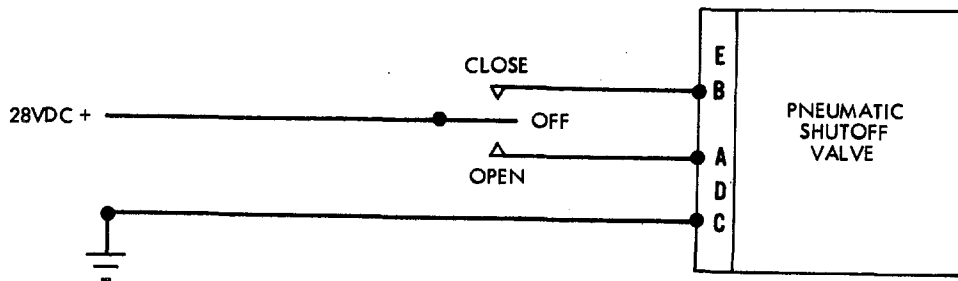
R 5. A. (7) Check acceleration control thermostat temperature setting.

R NOTE: For those operators not possessing Test Set
R Part No. 290417-5-1 proceed to paragraph (8).

R (a) Install thermostat calibration test set in accordance with
R step 3.A.(6).

R (b) Disconnect customer furnished venturi from pneumatic shutoff
R valve and connect a suitable hose of sufficient length to
R pneumatic shutoff valve to vent bleed air overboard.

R (c) Disconnect electrical connector from pneumatic shutoff valve.
R Connect a locally manufactured switch and harness assembly to
R pneumatic shutoff valve connector. (See figure 501A.)



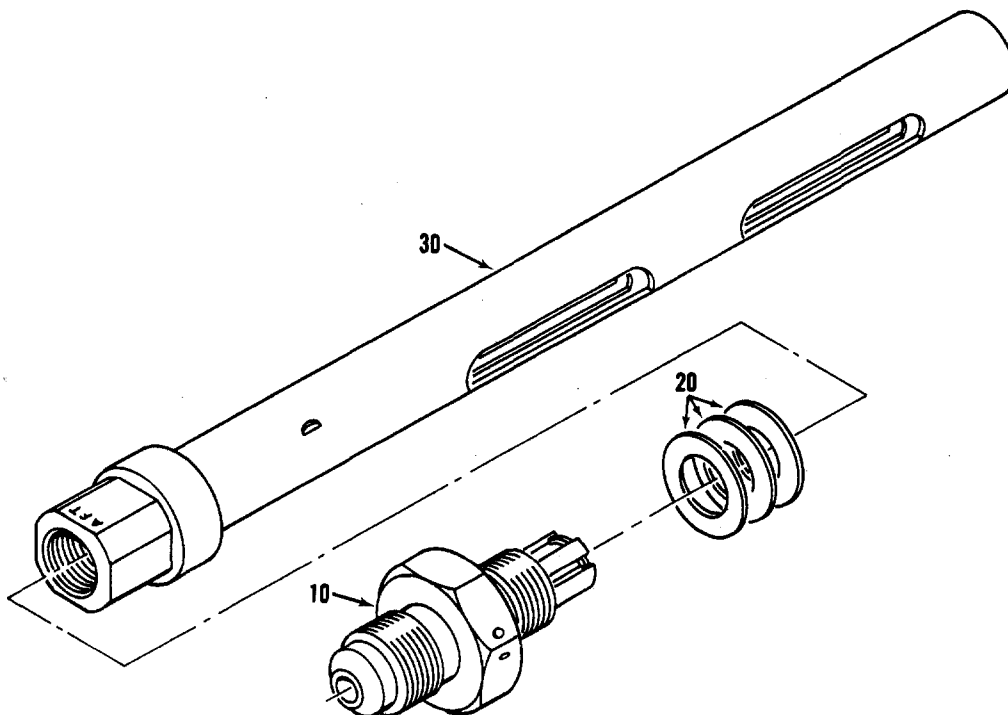
W-55G-110

Pneumatic Shutoff Valve Test Switch and
Harness Assembly Wiring Diagram
Figure 501A

49-20-00
Page 510
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12233

1. VALVE (FITTING)
2. SHIMS (CALIBRATION)
3. BODY

Pneumatic Thermostat
Figure 502

49-20-00
Page 511
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

- R 5. A. (7) (d) Provide an external source of 28 volt DC power to switch and
R harness assembly.

R CAUTION: OBSERVE ALL REQUIREMENTS SPECIFIED IN PRE-
R CAUTIONARY REQUIREMENTS. ENSURE THAT
R PNEUMATIC SHUTOFF VALVE IS IN CLOSED POSI-
R TION PRIOR TO ENGINE START.

- R (e) Start and operate engine to no-load governed speed observing
R all procedures specified in Check Engines Start, Acceleration,
R Operation and Automatic Controls Actuation. Allow engine to
R operate at no load speed for approximately two minutes to sta-
R bilize operation.

- R (f) Using switch installed in step (c), slowly bump open pneumatic
R shutoff valve until EGT reads 593C (1100F). Allow engine to
R stabilize at this temperature for two mintues.

R CAUTION: DO NOT EXCEED EXHAUST GAS TEMPERATURE SPECI-
R FIED IN TABLE 503.

- R (g) Continue opening pneumatic shutoff value while observing EGT
R reading on tester. The EGT at which the first sign of an RPM
R droop (on aircraft indicator) is noted can be recorded as the
R set point for control by the acceleration control thermostat.
R This temperature shall not exceed limits specified in Table
R 503.

R Table 503. Engine Exhaust Gas Temperature (EGT) Settings

R EGT Measurement	Pneumatic (Acceleration Control) Thermostat
R Test Set Thermocouple	688 ±5C (1270 ±10F)



MAINTENANCE MANUAL
GTCP30-92C(A)

CAUTION: IF ACCELERATION CONTROL SET POINT DOES NOT OCCUR BEFORE EXHAUST GAS TEMPERATURE REACHES 693C (1280F), CLOSE PNEUMATIC SHUTOFF VALVE USING SWITCH INSTALLED IN STEP (C) TO UNLOAD ENGINE. ALLOW ENGINE TO OPERATE AT NO LOAD SPEED FOR TWO MINUTES. SHUT DOWN ENGINE AND ADJUST ACCELERATION CONTROL THERMOSTAT IN ACCORDANCE WITH STEP (H).

5. A. (7) (h) If thermostat temperature is not within limits specified in Table 503, adjust as follows.

CAUTION: WHEN REMOVING AND INSTALLING CONTROL AIRLINE TO THERMOSTAT USE BACKUP WRENCH ON FLATS OF THERMOSTAT FITTING TO PREVENT CHANGE OF SETTING AND DAMAGE TO THERMOSTAT.

1 Disconnect control air line at thermostat and remove valve from body.

2 Add or remove shims (20, figure 502) as required. An increase of 0.001 inch in total shim thickness decreases the thermostat setting approximately 17C (30F). A decrease in total shim thickness of 0.001 inch will increase the setting a similar amount.

CAUTION: DO NOT BACK OFF FITTING TO REDUCE THERMOSTAT SETTING AFTER TIGHTENING TO TORQUE LIMITS. RE-SHIM AND RETIGHTEN WITHIN TORQUE LIMITS AND REPEAT TEST.

NOTE: Thermostat adjustments of less than 17C (30F) may be secured by adjusting the torque value between the limits of 150 to 175 inch-pounds when tightening the valve on body.

3 Reinstall thermostat valve on body and tighten as required to secure the required setting while maintaining a tightening torque tolerance within the limits of 150 to 175 inch-pounds.

4 Recheck the thermostat temperature two successive times. The thermostat temperatures observed shall be within $\pm 3C$ ($\pm 5F$) for the two successive checks or thermostat shall be rejected.



MAINTENANCE MANUAL
GTCP30-92C(A)

- R 5. A. (7) (i) Remove Test Set Part No. 290417-5-1.
- R (j) Disconnect hose from pneumatic shutoff valve and reconnect
R customer furnished venturi to pneumatic shutoff valve.
- R (k) Disconnect locally manufactured switch and harness assembly
R from pneumatic shutoff valve and reconnect electrical connec-
R tor to pneumatic shutoff valve.
- R (8) Check acceleration control thermostat NOT using Test Set Part No.
R 290417-5-1.
- R (a) Disconnect customer furnished venturi from pneumatic shutoff
R valve and connect a suitable hose of sufficient length to
R pneumatic shutoff valve to vent bleed air overboard.
- R (b) Disconnect electrical connector from pneumatic shutoff valve.
R Connect a locally manufactured switch and harness assembly to
R pneumatic shutoff valve connector. (See figure 501A.)
- R (c) Provide an external source of 28 Volt DC Power to switch and
R harness assembly.
- R CAUTION: ENSURE THAT THERE ARE NO AIR LEAKS AT AIR
R PRESSURE GAGE CONNECTION TO CONTROL
R AIRLINE. AIR LEAKS COULD ADVERSELY AFFECT
R THE RESULT OF THE ACCELERATION CONTROL
R THERMOSTAT CHECK.
- R (d) Install a 0 to 50 psi air pressure gage in the control air
R line from control air source fitting on engine to fuel
R control. Ensure that there are no air leaks at air pressure
R gage connections.



MAINTENANCE MANUAL
GTCP30-92C(A)

R
R
R
R

CAUTION: OBSERVE ALL REQUIREMENTS SPECIFIED IN PRE-CAUTIONARY REQUIREMENTS. ENSURE THAT PNEUMATIC SHUTOFF VALVE IS IN CLOSED POSITION PRIOR TO ENGINE START.

R
R
R
R
R

5. A. (8) (e) Start and operate engine to no-load governed speed observing all procedures specified in Check Engines Start, Acceleration, Operation and Automatic Controls Actuation. Allow engine to operate at no load speed for approximately two minutes to stabilize operation.

R
R
R

- (f) Using switch installed in step (b), slowly bump open pneumatic shutoff valve until EGT reads 593C (1100F). Allow engine to stabilize at this temperature for two minutes.

R
R

CAUTION: DO NOT EXCEED EXHAUST GAS TEMPERATURE SPECIFIED IN TABLE 503.

R
R
R
R
R
R

- (g) Continue opening pneumatic shutoff valve while observing EGT reading on aircraft indicator. The EGT at which the first sign of a drop in pressure on air pressure gage installed in step (d) is noted can be recorded as the set point for the acceleration control thermostat. This temperature shall not exceed limits specified in Table 503.

R
R
R
R
R
R
R

CAUTION: IF ACCELERATION CONTROL SET POINT DOES NOT OCCUR BEFORE EXHAUST GAS TEMPERATURE REACHES 693C (1280F), CLOSE PNEUMATIC SHUTOFF VALVE USING SWITCH INSTALLED IN STEP (B), TO UNLOAD ENGINE. ALLOW ENGINE TO OPERATE AT NO LOAD SPEED FOR TWO MINUTES. SHUT DOWN ENGINE AND ADJUST THERMOSTAT IN ACCORDANCE WITH PARAGRAPH 5.A.(7)(H).

R
R

- (h) If thermostat is not within limits specified in Table 503, adjust in accordance with paragraph 5.A.(7)(h).

R
R

- (i) Disconnect hose from pneumatic shutoff valve and reconnect customer furnished venturi to pneumatic shutoff valve.



MAINTENANCE MANUAL
GTCP30-92C(A)

R 5. A. (8) (j) Disconnect locally manufactured switch and harness assembly
R from pneumatic shutoff and reconnect electrical connector to
R pneumatic shutoff valve.

R (k) Remove 0 to 50 psi and pressure gage from control line from
R control air source fitting on engine to fuel control and
R reconnect control air line.

R (9) Calibration of overspeed switch and governor.

NOTE: If overspeed switch actuation point is not as specified in Table 502, refer to Section 49-60-31.

(10) Calibration of oil pressure regulator.

CAUTION: THE PRESSURE PORT SUPPLIED AT THE FILTER ELEMENT OF THE REMOTE OIL FILTER SYSTEM IS A MONITOR PORT ONLY AND SHALL NOT BE USED FOR OIL PRESSURE REGULATOR ADJUSTMENT. AN ERRONEOUS READING MAY CAUSE BEARING DAMAGE.

NOTE: Pressures at remote oil filter monitor port may normally vary between 35 and 45 psig. Pressure lower than 35 psig may indicate oil pump or oil pressure regulator problems. Pressures higher than 45 psig after engine warm up may indicate filter contamination and/or excessive flex line pressure losses. Filter loop bypass will occur at 50 psig.

(a) Engines with remote oil filter systems (see figure 1, Description and Operation).

1 Adjust oil pressure regulator, after stabilizing at operating temperature, to 35 +1.0/-1.0 psig as read at calibration pressure port (50).



MAINTENANCE MANUAL GTCP30-92C(A)

ENGINE - INSPECTION/CHECK

1. General

A general inspection for leakage at fittings, security of component part attachment, chafing of wiring harness and obstructions at inlet and exhaust areas shall be made at each inspection interval. Inspect all tubes for chafing, cracks, signs of corrosion or other damage.

2. Periodic Inspection Requirements

A. Inspection Requirements

Components listed in Table 601 shall be checked periodically at specified intervals. The inspection interval should not be increased unless a program consisting of an incremental increase (100 to 150 APU hour increments) on a sampling basis is undertaken by the individual operator to substantiate that an increase in time between inspection intervals would not adversely affect the APU.

NOTE: Oil system drain/refill and oil filter removal/replacement shall not exceed 250 APU hours maximum unless specific approval has been granted in writing by Garrett. This limit is not an absolute maximum and may be increased on an individual operator basis when justified by Garrett's oil sampling program and operational experience. If criteria for 250 APU hours or cycles are not met oil should be changed at 6 month intervals.

Table 601. Periodic Inspection Requirements

Section/Component	Interval		Nature of Inspection
	(APU hours)	(Cycles)	
Wiring, Tubing, Ducts and Fittings	Daily/ Preflight	-	Visually inspect for condition, security of installation, leakage or chafing.
Compressor, Air Intake and Turbine Exhaust Ducts	Daily/ Preflight	-	Inspect for foreign material or obstructions.
Exhaust Gas Temperature	Daily/ Preflight	-	Observe during starting, at no-load and full-load operation.
Oil Supply	Daily/ Preflight	-	Check and replenish as necessary with lubricating oil.
Fuel Supply	Daily/ Preflight	-	Check and replenish as necessary.

TEMPORARY REVISION NO. 49-8

To holders of Pneumatic and Shaft Power Gas Turbine Engine Maintenance Manual Report No. 49-23-23, Revision 1, dated May 11, 1987. Insert facing page 602, 49-20-00.

Reason: To revise the inspection intervals for the lubricating oil system and oil filter element.

The inspection intervals for the lubricating oil system and oil filter element are revised to read as follows.

Table 601. Periodic Inspection Requirements (Cont)

Section/Component	Interval		Nature of Inspection
	(APU hours)	(Cycles)	
Lubricating Oil System	250/ 12 months	250	Drain and refill. (Refer to SERVICING.)
Oil Filter Element	250/ 12 months	250	Remove and replace. (Refer to Section 49-90-18.)



MAINTENANCE MANUAL
GTCP30-92C(A)

Table 601. Periodic Inspection Requirements (Cont)

Section/Component	Interval		Nature of Inspection
	(APU hours)	(Cycles)	
R Oil Breather Tube Assembly and Fitting	500	250	Check that tube assembly and fitting are not obstructed.
R Pneumatic (Load Control Control) Thermostat	500	250	Check calibration. Replace or calibrate if setting is high. Do not replace or calibrate if setting is low unless APU cannot carry shaft load. (Refer to Section 49-20-00 ADJUSTMENT/TEST.)
R Pneumatic (Acceleration Control) Thermostat	500	250	Check calibration. (Refer to Section 49-20-00 ADJUSTMENT/TEST.)
Lubricating Oil System	250/ 6 months	250	Drain and refill. (Refer to Section 49-20-00 ADJUSTMENT/TEST.)
Vent Lines	250	250	Inspect for cracks, replace if necessary.
Turbine Plenum Drain (Fuel Drain Valve)	250	250	Check for air flow during APU operation. No air flow is permitted. Check for air flow during APU shutdown. Clean or replace if valve leaks during APU operation or if not fully open when APU is shutdown. (Refer to Section 49-30-19.)
Fuel Filter Element	250	250	Remove and replace. (Refer to Section 49-30-20.)
Oil Filter Element	250/ 6 months	250	Remove and replace. (Refer to Section 49-90-18.)
Inlet Screen	500	500	Inspect for damage and clean as required.
Accelerating Limiter Valve Orifice	500	500	Inspect for obstructions and fuel leakage at fittings.



49-20-00
Page 602
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

Table 601. Periodic Inspection Requirements (Cont)

Section/Component	Intervals		Nature of Inspection
	(APU hours)	(Cycles)	
NOTE: Manufacturer recommends that the combustor unit consisting of a combustion chamber liner assembly, combustor cap assembly, igniter plug, fuel atomizer assembly, and fuel check valve be replaced as a unit.			
Fuel Atomizer Assembly	500	500	Remove, clean and flow check. (Refer to Section 49-30-14.)
Igniter Plug	500	500	Remove, clean and inspect. (Refer to Section 49-40-11.)
Fuel Control Unit	500	500	Check acceleration limiter valve operation. Check crack pressure, adjust if necessary. (Refer to Section 49-20-00 ADJUSTMENT/TEST.)
Output Pad	500	500	Clean and lubricate spline. Check for shaft leakage. (Refer to Section 49-20-05.)
Internal Engine Parts Requiring Lubrication	-	-	Prior to starting engine after installation and after extended periods of inactivity, pre-oil and prime engine in accordance with Servicing.
Combustor Unit	500	500	Remove, inspect, repair as necessary and reinstall. (Refer to Section 49-20-04.)
Oil Pressure Regulator	500	500	Check and reset as necessary. (Refer to Section 49-20-00 ADJUSTMENT/TEST, step (10).)
Turbine Plenum Assembly, Turbine Plenum Gasket, Turbine Torus Assembly, and Turbine Nozzle Assembly	500	500	Check these components at time of combustor unit removal and/or replacement by thorough visual inspection using boroscope through combustor unit opening in the turbine plenum assembly.
Turbine Wheel	2500	2500	Penetrant inspect turbine wheel for cracks (Refer to paragraph 4, TURBINE WHEEL INSPECTION.)



MAINTENANCE MANUAL
GTCP30-92C(A)

Table 601. Periodic Inspection Requirements (Cont)

Section/Component	Intervals		Nature of Inspection
	(APU hours)	(Cycles)	
Hot Section Components	*		Perform detailed hot section inspection. Refer to paragraph 4. HOT SECTION INSPECTION.

*Refer to paragraph 3. On-Condition Maintenance Requirements

3. On-Condition Maintenance Recommendations

NOTE: The International Air Transport Association (IATA) definition of "ON-CONDITION" is: "A primary maintenance process having repetitive inspections or tests to determine the condition of units, systems, or portions of structure with regard to continued serviceability (corrective action is taken when required by item condition)."

A. On-Condition Maintenance Recommendations

NOTE: The manufacturer recommends the On-Condition maintenance concept for the GTCP30-92C(A) engines in lieu of a firm overhaul time period.

When using the On-Condition maintenance concept, a Hot Section Inspection is recommended at each 2500 APU operating hours for GTCP30-92C(A) units. Manufacturer shall be contacted prior to operating APU's in excess of 4000 hours.

4. Turbine Wheel Inspection

Table 602. Materials and Compounds

Material or Compound	Manufacturer
<u>NOTE:</u> Equivalent substitutes may be used for listed items.	
High temperature compound (Fel-Pro C5-A)	Fel-Pro Inc, Div of Felt Products Mfg Co, 7450 N McCormick Blvd, Skokie, IL 60076



MAINTENANCE MANUAL
GTCP30-92C(A)

Table 602. Materials and Compounds (Cont)

Material or Compound	Manufacturer
Methyl-ethyl-ketone (MEK) (Federal Specification TT-M-261)	Commercially available
Spotcheck dye penetrant test kit - Type HRS-1 (Consisting of: SKC-NF Cleaner, SKL-HF Penetrant, SND-NF Developer)	Magnaflux Corp, 7300 W Lawrence Ave, Chicago, IL 60656
1,1,1-Trichloroethane (MIL-T-81533)	Commercially available

4. A. General

The APU shall be removed from installation for purpose of accomplishing hot section inspection.

B. Disassembly

- (1) Obvious steps or procedures necessary to disassemble the engine, such as removal of lockwire, attaching parts, or simple components, are omitted from the text. Removal of plumbing, electrical, and external parts installation may be accomplished whenever parts are accessible.

The following general procedures should be observed throughout the disassembly operations.

- (a) Place each part disassembled on a clean workbench in the order of removal in preparation for cleaning and inspection. Keep hardware and small parts together in trays.
- (b) Provide proper coverings or supports to protect shafts, gears, studs, and projecting parts from damage.
- (c) Do not use steel or lead hammers directly on assemblies or their parts. Use cellulose-tipped hammers or fiber or rawhide mallets as specified. Do not clamp parts directly in the steel jaws of a bench vise. Use a vise having micarta jaws or equivalent.
- (d) After disassembly, spray steel parts with oil, using oil of specification used in the engine lubrication sytem. Cover all parts with clean paper or suitable coverings unless cleaning and inspection is to be accomplished immediately.



MAINTENANCE MANUAL
GTCP30-92C(A)

4. B. (1) (e) Do not disassemble tube assemblies, hose assemblies, wiring harness assemblies, riveted assemblies, or staked or press-fit parts (except seals and bearings) or remove nameplates, modification plates, lubrication plates, decals, studs, or their lock rings, or thread inserts, unless specifically required in the text or necessary for replacement of a part. If disassembly or removal is necessary, proceed in a manner consistent with good shop practice.

- (f) Always keep ports, bores, and passages of assemblies or components sealed with tape or suitable closures between overhaul procedures. Cover large openings with cardboard taped in place.

NOTE: Do not use tape to cover openings or connections on fuel or lubrication system components.

- (g) During various stages of disassembly, examine all parts and assemblies for signs of scoring, burning, or other defects. Note physical conditions which will not be apparent after cleaning. Tag involved parts before they are cleaned and laid out for detail inspection. Check additionally for evidence of damage caused by improper procedures at previous overhauls. Report such damage in accordance with current practice.

- (h) Note and record number and thickness of all shims or shim washers removed from the various components of the engine for reference at reassembly.

- (i) Record manner of lockwiring for duplication at reassembly.

C. Perform Turbine Wheel Inspection

CAUTION: ENSURE THAT FOREIGN MATERIAL DOES NOT ENTER INLET AREA OF ENGINE DURING REMOVAL, INSPECTION AND INSTALLATION OF HOT SECTION COMPONENTS.

- (1) Remove hot section as follows. (See figure 601.)

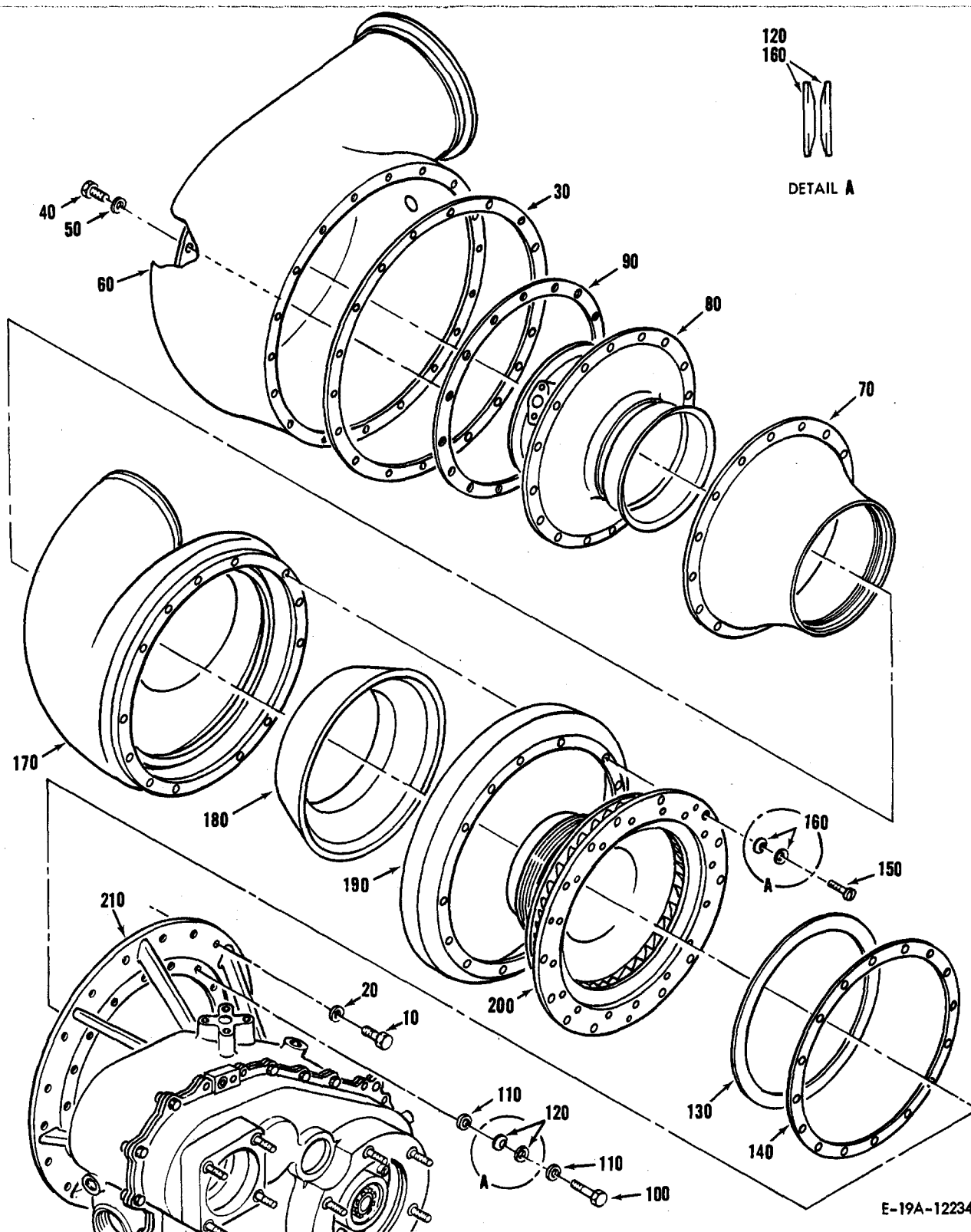
- (a) Disconnect and remove plumbing and electrical installation components as necessary to effect removal of hot section components. (Refer to Section 49-20-01.)

KEY TO FIGURE 601

10. PLENUM BOLT	80. EXHAUST DUCT	150. SCREW
20. WASHER	90. PLENUM SHIM	160. SPRING WASHER
30. PLENUM GASKET	100. NOZZLE BOLT	170. TORUS ASSY
40. EXHAUST DUCT BOLT	110. WASHER	180. INNER CONTAINMENT RING
50. WASHER	120. SPRING WASHER	190. OUTER CONTAINMENT RING
60. PLENUM ASSY	130. COMPRESSOR SEAL SHIM	200. NOZZLE ASSY
70. CONE ASSY	140. TURBINE WHEEL SHIM	210. TURBINE AND GEARCASE SECTION



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12234

Hot Section Components Removal/Installation
Figure 601

49-20-00
Page 607
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

4. C. (1) (b) Remove combustor unit. (Refer to Section 49-20-04.)
- (c) Remove pneumatic thermostat. (Refer to Section 49-50-04.)
- (d) Remove exhaust gas temperature thermocouple. (Refer to Section 49-70-22.)

CAUTION: ENSURE THAT FOREIGN MATERIAL DOES NOT ENTER INLET AREA OF ENGINE DURING REMOVAL, INSPECTION, AND INSTALLATION OF HOT SECTION COMPONENTS.

- (e) Stand engine on exhaust end. Remove lockwire from plenum and nozzle bolts (10, 100).
- (f) Reverse engine position and stand on accessory end with exhaust end up. Remove lockwire from exhaust duct bolts (40).

NOTE: Index mark plenum assembly (60) to exhaust duct (80) for aid during assembly.

- (g) Remove exhaust duct bolts (40) and washers (50).

NOTE: Index mark plenum assembly (60) to housing for aid during assembly.

Note and record thickness of plenum gaskets (30) and plenum shims (90) for aid during assembly.

- (h) Remove plenum bolts (10) and washers (20), then remove plenum assembly (60), plenum gaskets (30), and plenum shims (90).
- (i) Remove exhaust duct (80) and cone assembly (70) from nozzle assembly (200).
- (j) Remove nozzle bolts (100), washers (110), and spring washers (120), then carefully lift assembled torus assembly (170) inner and outer containment rings (180, 190), and nozzle assembly (200) from engine.

NOTE: Note and record thickness of compressor seal shims (130) and turbine wheel shims (140) for aid during assembly.

- (k) Remove compressor seal shims (130) and turbine wheel shims (140).



MAINTENANCE MANUAL
GTCP30-92C(A)

NOTE: Index mark torus assembly (170) and outer containment ring (190) to nozzle assembly (200). Note orientation of spring washers (160) for aid during assembly.

4. C. (1) (1) Remove lockwire screws (150), and spring washers (160) securing torus assembly (170), outer containment ring (190), and nozzle assembly (200). Remove torus assembly and containment rings (180, 190) from nozzle assembly.

D. Cleaning

Table 603. Materials and Compounds

Material or Compound

Manufacturer

NOTE: Equivalent substitutes may be used for listed items.

1,1,1-Trichloroethane
(MIL-T-81533)

Commercially available

Glass beads (Screen No.
100-230 (130 Grit) Class
IV, Size AF or AG)

Potters Brothers Inc, 600 Industrial
Rd, Carlstadt, NJ 07072

Solvent, Stoddard (Federal
Specification P-D-680, Type I)

Commercially available

(1) General cleaning instructions.

NOTE: At no time shall the compressor section be sprayed with a corrosion preventing compound or cleaning compound. No hydrocarbon or oils shall ever be introduced into the compressor section.

- (a) This topic provides general cleaning information for combustion and exhaust components. Specific cleaning procedures for individual parts should be consistent with good shop practices and the following instructions. Correct and thorough cleaning of all components is important to successful inspection, maintenance and satisfactory operation after maintenance.



MAINTENANCE MANUAL
GTCP30-92C(A)

WARNING: CLEANING SHALL BE PERFORMED IN A CLEAN, VENTILATED, WELL-LIGHTED ROOM, RUBBER GLOVES AND PROTECTIVE CLOTHING SHALL BE WORN. EXTINGUISHERS AND VAT OR TANK COVERS SHALL BE ON HAND IN CASE OF FIRE.

4. D. (1) (b) After cleaning, components shall be placed on clean paper-covered benches. Ports and orifices shall be capped, plugged, or sealed, and protected from dust or other contaminant by clean paper or plastic covers.

(c) All parts shall be cleaned to remove oil, grease, rust, stains, and soiled areas. Flange areas, register diameters, and sealing surfaces shall be cleaned of oil, gaskets, and sealing compounds, if present. Corrosion products whenever they appear, shall be removed and the base metal retreated before reassembly. Heat discoloration of metal surfaces due to normal service temperature is not objectionable; however, scale that may come loose and damage the engine must be removed. Carbon residue and combustion products shall be removed. Paint films that are tightly bonded to base metal and are otherwise serviceable shall not be removed. Refer to Table 604 for cleaning method applicable to hot section components.

(2) Clean hot section components.

WARNING: VAPORS ARE TOXIC AND SHALL NOT BE INHALED. OBSERVE ALL FIRE PRECAUTIONS.

NOTE: Sandblasting shall not be used if part is to be subjected to magnetic particle inspection.

(a) Degrease parts with solvent, Stoddard (Federal Specification P-D-680, Type I). Hard carbon deposits that remain may be removed by glass bead peening, sandblasting, or soaking in a decarbonizing solution.

WARNING: TRICHLOROETHANE IS TOXIC, USE IN A WELL-VENTILATED AREA. AVOID BREATHING FUMES OR CONTACT WITH SKIN.

(b) Use 1,1,1-trichloroethane (MIL-T-81533) in vapor degreaser at a temperature range of 86 to 90C (180F to 194F).

CAUTION: REGULATE AIR PRESSURE TO KEEP EROSION OF BASE METAL TO A MINIMUM.

(c) Clean parts using glass beads (Screen No. 100-230 (130 Grit) Class IV, Size AF or AG). Hard carbon, paint, corrosion, and scale may be removed by glass bead peening.



MAINTENANCE MANUAL
GTCP30-92C(A)

Table 604. Cleaning Methods

Nomenclature	Degreasing	Carbon Removing Solutions
Cone Assy	X	X
Containment Rings	X	X
Exhaust Duct	X	X
Nozzle Assy	X	X
Plenum Assy	X	X
Torus Assy	X	X

4. E. Inspection/Check

Table 605. Materials and Compounds

Material or Compound	Manufacturer
<u>NOTE:</u> Equivalent substitutes may be used for listed item.	
Spotcheck dye penetrant test kit Type HRS-1 (consisting of SKC-NV cleaner, SKL-HF penetrant, SKD-NF developer)	Magnaflux Corp, 7300 W Lawrence Ave, Chicago, IL 60656

(1) General.

The following methods and procedures can be accomplished by personnel who maintain the equipment in the field. A careful visual inspection shall precede any detail checks to eliminate unnecessary inspection procedures and to determine the extent of further checking. Long life and continued efficient operation of the engine depend upon the care and accuracy with which inspections are conducted.



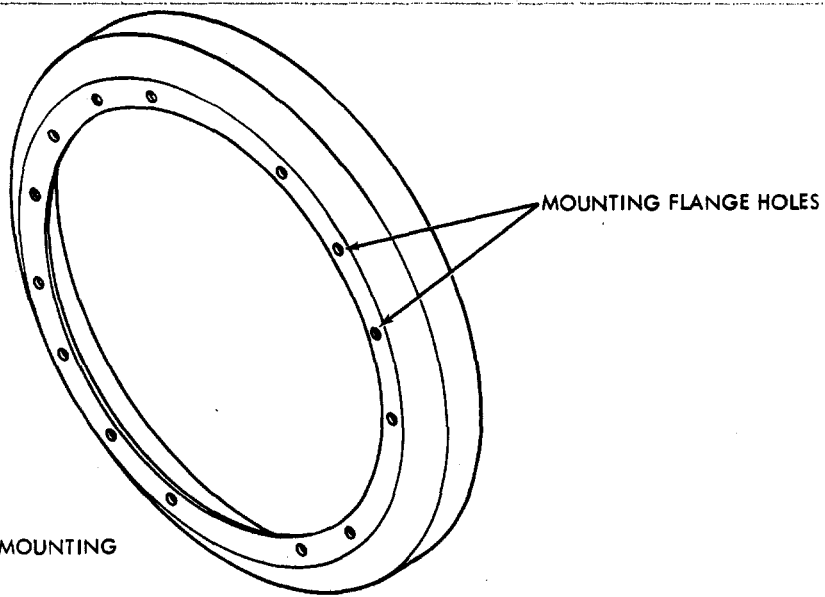
MAINTENANCE MANUAL
GTCP30-92C(A)

4. E. (2) Inspect hot section components (see figure 601).
- (a) Visually inspect plenum assembly for cracks. Refer to Repair if cracks are indicated.
 - (b) Check plenum gasket for evidence of deterioration or leakage. Replace plenum gasket if deterioration or leakage indicated.
 - (c) Visually inspect exhaust duct for cracks. Refer to Repair if cracks are indicated.
 - (d) Visually inspect cone assembly for cracks. Any crack in cone assembly is cause for replacement.
 - (e) Visually inspect torus assembly for cracks and deformation. Refer to Repair if damage is indicated.
 - (f) Visually inspect inner containment ring for cracks. Any crack in containment ring is cause for replacement.
 - (g) Inspect outer containment ring for cracks as shown in Figure 602. Refer to Repair if unacceptable cracks are indicated.
 - (h) Visually inspect nozzle assembly for cracks, scoring, erosion, and feathering damage as follows. (See figure 603.)
 - 1 Inspect for cracks in shroud that extend inward from vane OD (item 1). Replace nozzle if cracks in shroud extend inward beyond outer periphery of vanes.
 - 2 Inspect shroud contour for scoring and cracks (item 2). Replace nozzle if scoring or cracks on shroud contour exceeds 0.030 inch in depth.
 - 3 Inspect vane leading edges for erosion (item 3). Replace nozzle if erosion damage at leading edge of vane exceeds 0.125 inch in depth.
 - 4 Inspect vane trailing for cracking or feathering (item 4). Replace nozzle if cracking or feathering type damage at trailing edge of vane exceeds 0.130 inch in depth.
 - 5 Inspect vanes for cracks (item 5). Replace nozzle if distance between cracks on leading and trailing edges of vane is less than 0.350 inch.
 - 6 Inspect vanes for cracks (item 6). Replace nozzle if cracks at leading or trailing edge exceed 0.500 inch in length on more than six adjacent vanes or ten non-adjacent vanes.

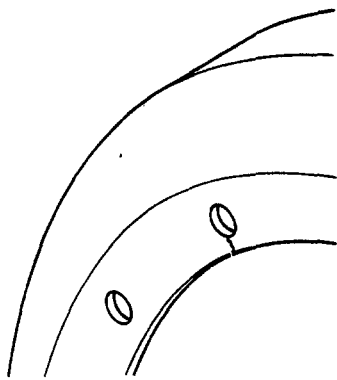
R



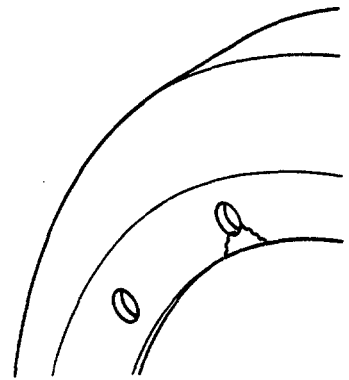
MAINTENANCE MANUAL
GTCP30-92C(A)



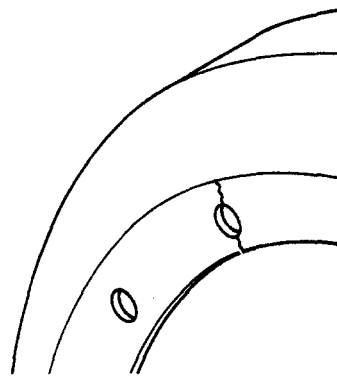
INSPECT SURFACE AREA AROUND MOUNTING
FLANGE HOLES AS FOLLOWS:



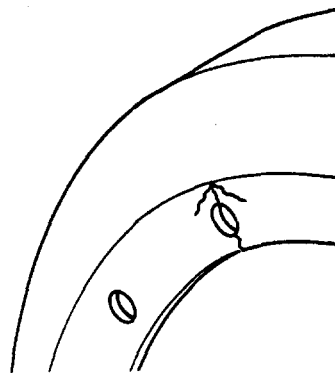
1. ACCEPTABLE



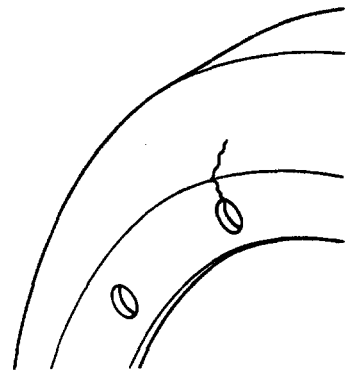
2. REPAIRABLE



3. REPAIRABLE



4. REPAIRABLE



5. NOT ACCEPTABLE

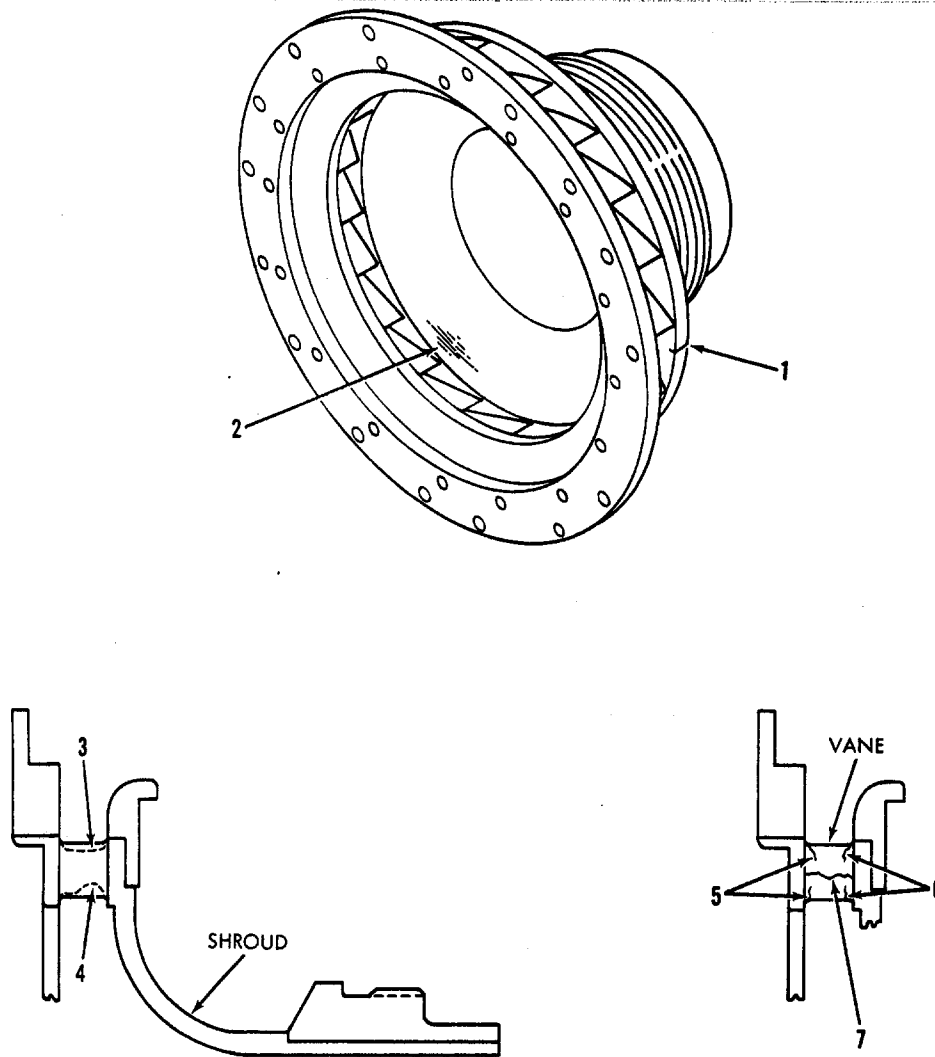
I-19A-4139

Inspection of Outer Containment Ring
Figure 602

49-20-00
Page 613
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)



I-19A-4929

Inspection of Nozzle Assembly (Typical)
Figure 603

49-20-00
Page 614
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

4. E. (2) (h) 7 Inspect vanes for axial cracks (item 7). Replace nozzle if axial cracks in vanes intersect so as to cause material loss, are open so as to disrupt gas stream, or are evident in more than eleven vanes.

- 8 Replace nozzle assembly if damage exceeds limits specified above.

(i) Inspect turbine wheel as follows.

- 1 Clean all foreign matter from blade ends and hub area of the exducer portion of the turbine wheel assembly, using SKC-NF cleaner from test kit (Type HRS-1), clean cloth, and appropriate swabs. Allow cleaner sufficient time to dissolve dirt, grease, and exhaust film. Repeat cleaning procedure until exducer is 100 percent clean. Wipe with clean cloth and allow to dry.

NOTE: Penetrant may be applied with swab which provides easy control over the amount of penetrant used or by direct spraying.

- 2 Apply SKL-HF penetrant from test kit (Type HRS-1) thoroughly to blade ends, contour and hub area of exducer portion of the turbine wheel assembly. Allow penetrant to dry for a minimum of two minutes.

NOTE: Use of a light spray of cleaner on cloth may be used for cleaning exducer. A slight trace of penetrant color may remain and will not affect the inspection results.

- 3 Wipe penetrant from all areas of the exducer, using a clean cloth for each surface cleaned.

CAUTION: A THIN, EVEN TRANSLUCENT LAYER IS DESIRED, AS EXCESSIVE APPLICATION MAY MASK DEFECTS.

- 4 Apply SKD-NF developer from test kit (Type HRS-1) to blade ends, contour and hub area of the exducer portion of the turbine wheel assembly.



MAINTENANCE MANUAL
GTCP30-92C(A)

NOTE: A borescope and/or mirror may be used if required to facilitate the inspection. Small cracks may require three to five minutes to become visible through developer.

4. E. (2) (i) 5 Visually inspect blade surfaces and saddle areas of turbine wheel as indicated in Figure 604. Cracks present in areas and surfaces indicated shall be cause for replacement.
- 6 Visually inspect turbine wheel for blade tip damage. Maximum permissible blade tip damage due to impact shall not exceed limits specified in Detail A. Impact damage which exceeds these limits is cause for replacement. Acceptable erosion damage shall not exceed limits specified in Detail B. Erosion damage which exceeds these limits is cause for replacement. Measure Diameter C to determine blade tip damage due to erosion and/or hot gas corrosion. Diameter C shall not be less than 6.000 inches (at minimum point).
- 7 Visually inspect each turbine wheel blade for cracks in trailing edge. See Detail C for acceptable and unacceptable cracks in turbine wheel blade trailing edges. Any continuous cracks which extend in excess of 0.050 inch in length along both sides of blade shall be cause for replacement.
- 8 Visually check shaft at exducer beam weld for cracks. Cracks at beam shall be cause for replacement.
- 9 Return APU to an authorized overhaul facility if turbine wheel fails to meet inspection requirements.

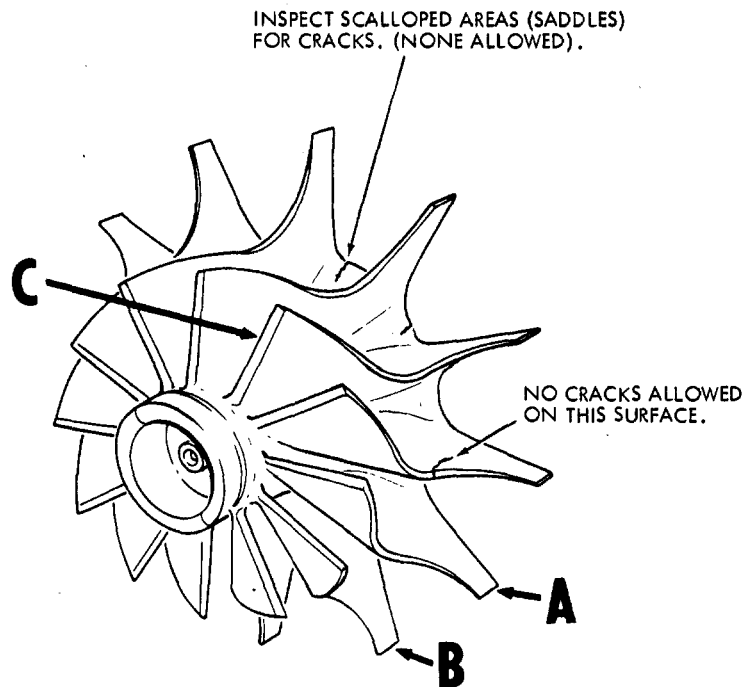
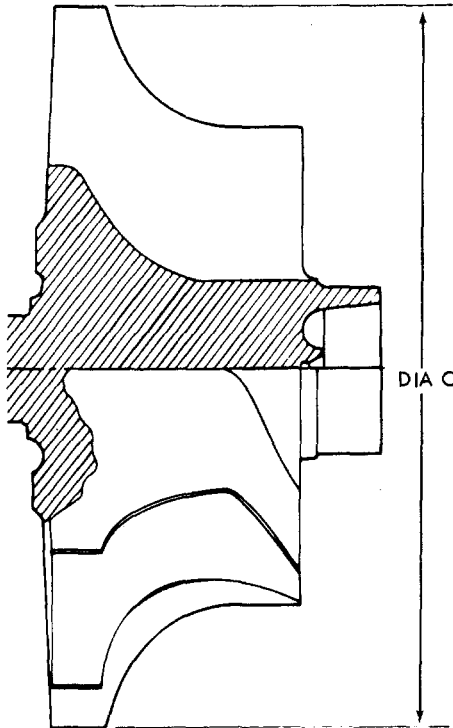
F. Repair

Table 606. Materials and Compounds

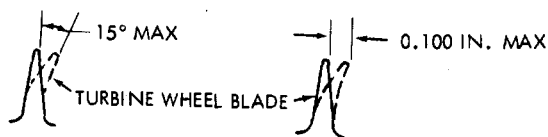
Material or Compound	Manufacturer
<u>NOTE:</u> Equivalent substitutes may be used for listed items.	
Abrasive cloth (Federal Specification P-C-451)	Commercially available
R INCO "A" filler rod (AMS5542)	Commercially available
349 Weld rod (AMS5782) or 347 Weld rod (AMS5680)	Commercially available



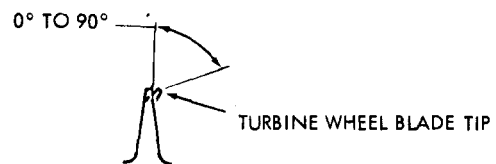
MAINTENANCE MANUAL GTCP30-92C(A)



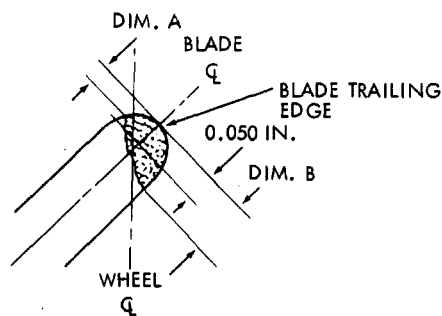
R



DETAIL A
(IMPACT DAMAGE)

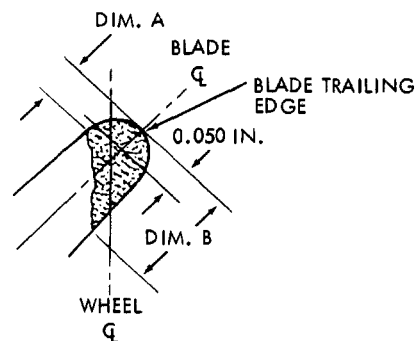


DETAIL B
(EROSION DAMAGE)



ACCEPTABLE BLADE TRAILING
EDGE CRACK (EITHER DIM. A
OR DIM. B IS LESS THAN 0.050
IN.).

DETAIL C



UNACCEPTABLE BLADE TRAILING
EDGE CRACK (BOTH DIM. A AND
DIM. B EXCEED 0.050 IN.).

DETAIL C

I-55G-256

Inspection of Turbine Wheel
Figure 604



MAINTENANCE MANUAL
GTCP30-92C(A)

4. F. (1) Repair or replace hot section components. (See figure 601.)

(a) Repair cracks in plenum assembly if required by inspection as follows.

- 1 Stop drill crack ends to prevent further progression of crack, then weld, using 349 weld rod (AMS5782) or 347 weld rod (AMS5680) with gas backup.
- 2 Use patches as necessary for crack repairs. Material for patches shall be CRES 321 stock, 0.040 inch thick (MIL-S-6721). Do not overlap one patch with another patch. All patches shall be applied to the outer skin of plenum. Weld patches in place using 349 weld rod (AMS5782) or 347 weld rod (AMS5680) with gas backup. Fill cracks on internal surface of plenum (which have been patched on outer skin) with weld and hand finish welds to within 0.010 inch of flush with parent material to assure that internal flow surfaces and joints are free of excess weld.
- 3 Perform dye penetrant inspection of welds in accordance with MIL-I-6866.
- 4 Cold work minor dents to contour of plenum.

(b) Repair exhaust duct if required by inspection as follows.

- 1 Stop drill crack ends to prevent further progression of crack, then weld using 347 weld rod (AMS5680) with gas backup.
- 2 Perform dye penetrant inspection at welds in accordance with MIL-I-6866.

(c) Repair cracks in torus assembly if required by inspection as follows.

- 1 Stop drill crack ends to prevent further progression of crack, then weld using INCO "A" Filler rod (AMS5542) with gas backup.
- 2 Perform dye penetrant inspection of welds in accordance with MIL-I-6866.
- 3 Cold straighten any deformation to contour of torus.

(d) Repair outer containment ring if required by inspection as follows. (See figure 602.)

- 1 Repair multiple cracks extending inward from bolt hole (item 2), by removing material that may break away. Deburr and smooth area using abrasive cloth (Federal Specification P-C-451) or a fine stone.



MAINTENANCE MANUAL
GTCP30-92C(A)

4. F. (1) (d) 2 Repair cracks extending from bolt holes (items 3 and 4) by stop drilling each crack end using a 0.060 inch diameter drill bit. Smooth out burrs with abrasive cloth (Federal Specification P-C-451) or a fine stone.
- 3 Replace containment ring if any crack extends beyond mounting flange (item 5).

G. Assembly

Table 607. Materials and Compounds

Material or Compound	Manufacturer
<u>NOTE:</u> Equivalent substitutes may be used for listed items.	
High temperature compound (Fel-Pro C5-A)	Fel-Pro Inc, Div of Felt Products Mfg Co, 7450 N McCormick Blvd, Skokie, IL 60076
Potting compound (S-2007)	Dow Corning Corp, S Saginaw Rd, P.O. Box 997, Midland, MI 48640
Potting compound (Alternate) (RTV732)	Dow Corning Corp, S Saginaw Rd, P.O. Box 997, Midland, MI 48640
Potting compound (Alternate) (RTV102, 106, 108, or 112)	General Electric Co, Silicone Products Dept, Waterford, NY 12188
Adhesive (GE1276)	General Electric Co, Insulating Materials Product Dept, One Campbell Rd, Schenectady, NY 12306

(1) General assembly instructions.

Assembly operations shall be performed with attention to details outlined in this manual. Highest standards of precision shop procedures shall be employed throughout the entire reassembly. Fits and tolerances shall be closely maintained. The following general instructions shall be observed throughout the assembly procedures.

- (a) Exercise extreme care to prevent dirt, dust, or foreign particles from entering the engine. If any foreign particle enters the engine during assembly, stop assembly until the foreign particle is located and removed, even if this causes considerable disassembly.



MAINTENANCE MANUAL
GTCP30-92C(A)

particle is located and removed, even if this causes considerable disassembly.

4. G. (1) (b) When special measurements for shimming or fitting are made on parts or on assembled parts prior to their installation in the next higher assembly, tag these parts as measured components of the higher assembly and keep with that assembly. If damage or other reason causes replacement of a measured component, repeat all measurements which include the part, using the new part.
- (c) Never use extreme force in the assembly of the unit. If difficulty is encountered, disassemble the unit and inspect for burrs or other interferences.
- (d) On through hole applications when extreme minimum stack conditions result in excessive protrusion of the screw or bolt through either the threaded part or nut, a shorter standard screw or bolt may be substituted providing the substitution results in a minimum of one full thread protrusion beyond the face of the threaded part or nut.

NOTE: No substitutions of screw lengths are authorized for blind hole applications.

- (e) On through hole applications when assembling parts which, through extreme stack conditions, result in a screw or bolt protrusion of less than one full thread beyond the face of the threaded part or nut, a longer standard screw or bolt may be substituted in order to gain a minimum of one full thread protrusion.
- (2) Follow safety fastening instructions.

Attaching parts may be locked using various methods as applicable to the part. These methods include use of self-locking nuts, and use of lockwire. The following general instructions shall be followed when installing locking devices.

- (a) Duplicate the locking method as noted during disassembly.

NOTE: During the "run-down" of a self-locking nut, the run-down resistance (frictional torque) shall be noted on the last rotation just before removing clearance between parts. The self-locking nut then shall be tightened to the specified torque value plus the noted frictional torque.

- (b) Install self-locking nuts using standard shop procedures for the type nut being used.

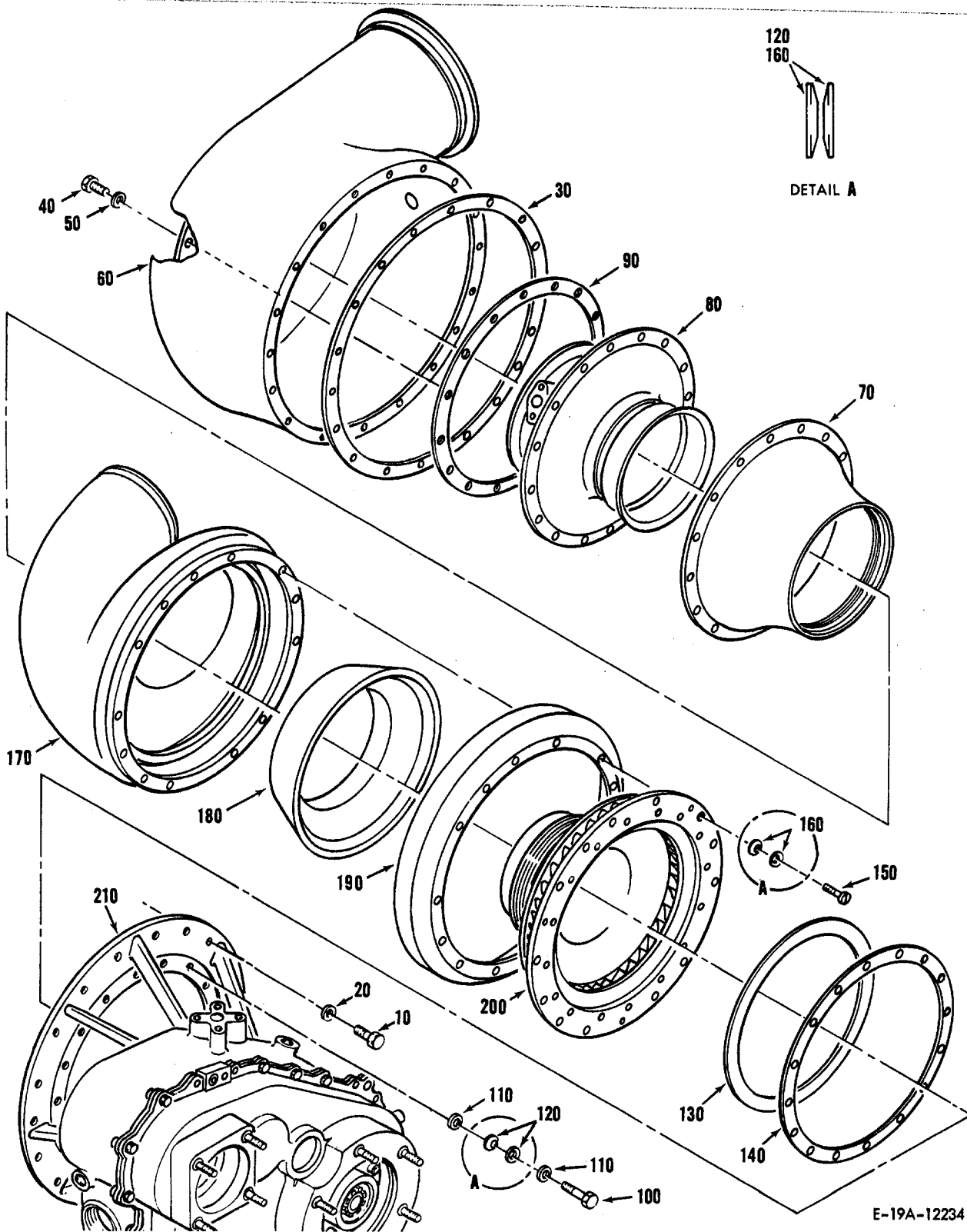


MAINTENANCE MANUAL
GTCP30-92C(A)

- R 4. G. (3) Install hot section components as follows. (See figure 605.)
- R (a) Determine nozzle assembly to turbine wheel shim requirements
R as follows. (See figure 606.)
- R 1 Place the engine in a vertical position (turbine wheel up).
- R 2 Carefully position nozzle assembly over the turbine wheel.
R The nozzle assembly should contact the contour of the tur-
R bine wheel blades.
- R 3 Place a 0.25 inch steel ball on the centering hole of the
R turbine wheel and parallel micing bars over nozzle assembly
R as shown in Figure 606.
- R 4 Using a depth micrometer, measure from micing bars to top
R of steel ball. Record measurement as Dimension A.
- R 5 Using a feeler gauge measure gap between nozzle assembly
R and nozzle shim surface. Add 0.010 to 0.012 inch to this
R measurement. The result equals trial thickness of turbine
R wheel shims (140, figure 605) required to provide 0.010 to
R 0.012 inch clearance between nozzle assembly and turbine
R wheel.
- R 6 Remove nozzle assembly (200) and install thickness of tur-
R bin wheel shims (140) determined in step 5. Temporarily
R install nozzle assembly and secure in place using slave
R bolts and nuts.
- R 7 Repeat steps 3 and 4 except record measurement as Dimension
R B.
- R 8 Subtract Dimension A from Dimension B ($B - A = 0.010$ to
R 0.012 inch), the result shall equal 0.010 to 0.012 inch.
R If the result is not within this range, add or subtract
R turbine wheel shims (140) to obtain 0.010 to 0.012 inch.
- R 9 Remove slave bolts and nuts. Remove nozzle assembly (200)
R and turbine wheel shims (140). Measure turbine wheel shim
R (140) thickness and record result as Dimension C.
- R (b) Determine compressor seal shim requirements as follows. (See
R figure 606A.)
- R 1 Measure and record Dimension D.
- R 2 Measure and record Dimension E.



MAINTENANCE MANUAL
GTCP30-92C(A)



Hot Section Components Removal/Installation
Figure 605

49-20-00
Page 622
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

R

NOTE: Dimension C was recorded in step (a)9.

R

R

R

R

R

R

R

4. G. (3) (b) 3 Using the following formula calculate required thickness of compressor seal shims (13) to obtain 0.000 to 0.002 inch gap between nozzle assembly and compressor seal. Dimension D, minus Dimension E, plus Dimension C +0.000/-0.002 inch equals thickness of compressor seal shims (130). ($D - E + C + 0.000/-0.002$ inch = thickness of compressor seal shims (130).)

R

R

R

- 4 Install turbine wheel shims (140) determined in step (a)9 and compressor seal shims (130) determined in previous step.

NOTE: Assemble spring washers (160) with concave sides facing away from each other. (See figure 605.)

- (c) Apply a coat of high temperature compound (Fel-Pro C5-A) to threads of screws, (150, figure 605). Secure assembled nozzle assembly (200), outer containment ring (190) and torus assembly (170) with screws, and spring washers (160). Tighten screws to a torque value of seven to nine inch-pounds. Lock-wire screws in pairs.
- (d) Carefully install assembled nozzle assembly (200), torus assembly (170), and outer containment ring (190), orientating torus assembly (170) opening as shown in Detail A, Figure 607.



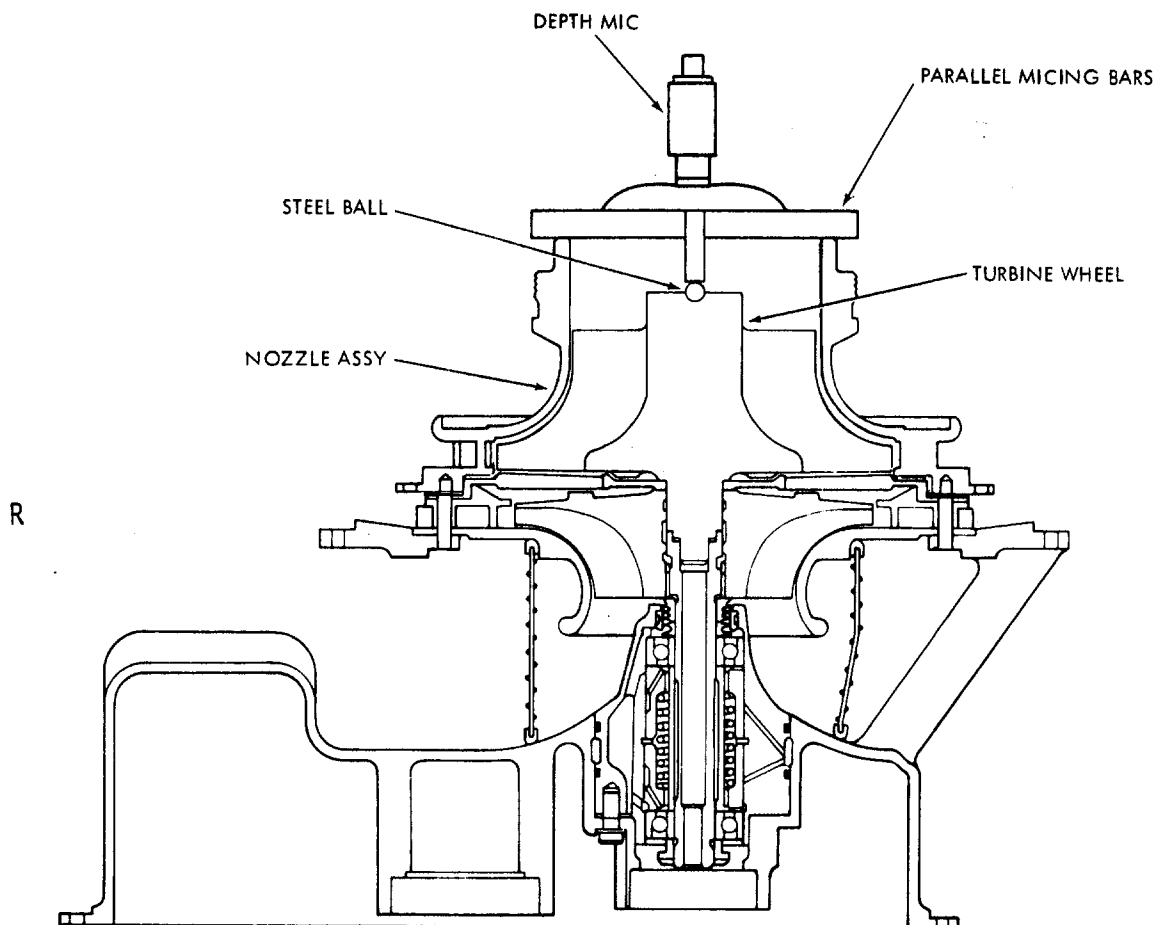
KEY TO FIGURE 605

10. PLENUM BOLT
20. WASHER
30. PLENUM GASKET
40. EXHAUST DUCT BOLT
50. WASHER
60. PLENUM ASSY
70. CONE ASSY
80. EXHAUST DUCT
90. PLENUM SHIM
100. NOZZLE BOLT
110. WASHER

120. SPRING WASHER
130. COMPRESSOR SEAL SHIM
140. TURBINE WHEEL SHIM
150. SCREW
160. SPRING WASHER
170. TORUS ASSY
180. INNER CONTAINMENT RING
190. OUTER CONTAINMENT RING
200. NOZZLE ASSY
210. TURBINE AND GEARCASE SECTION



MAINTENANCE MANUAL
GTCP30-92C(A)



I-19A-8501

Determine Turbine Wheel to Nozzle
Assembly Shim Requirement
Figure 606

49-20-00
Page 624
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

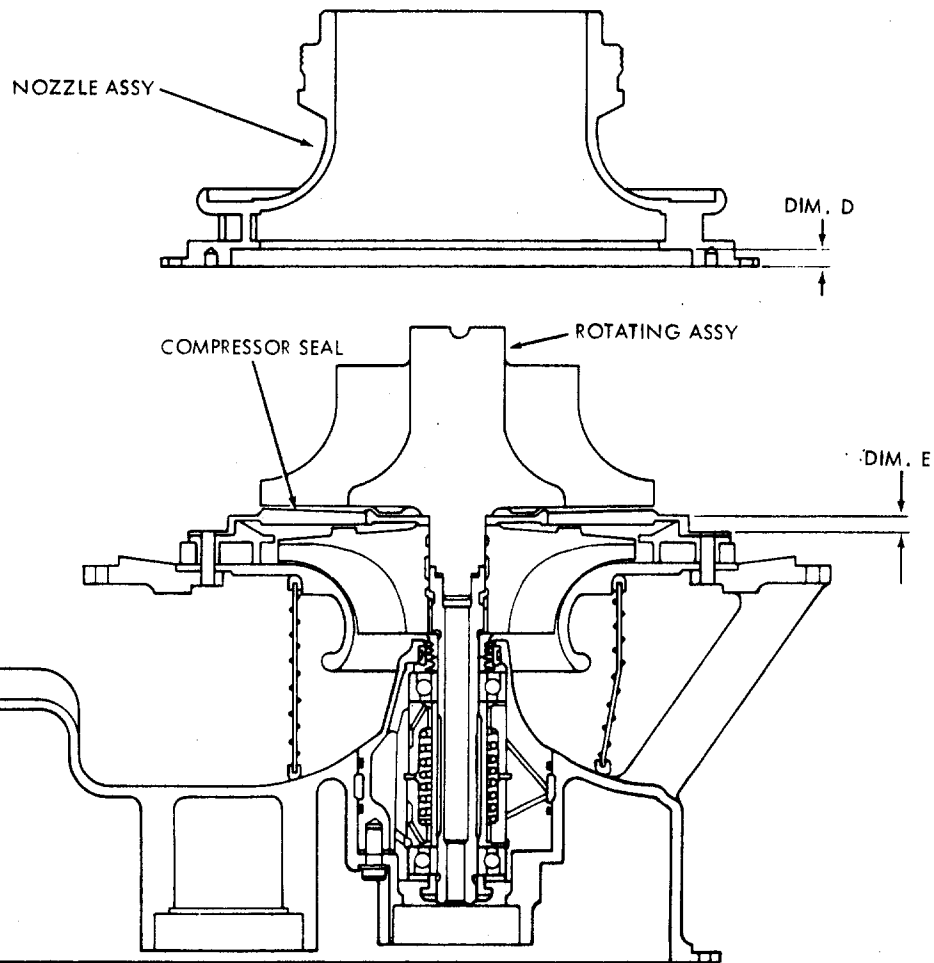
NOTE: Assemble one washer (110), two spring washers (120) with concave sides facing away from each other, then one washer and nozzle bolt (100). (See figure 605).

4. G. (3) (e) Apply a coat of high temperature compound (Fel-Pro C5-A) to threads of nozzle bolts (100). Secure assembled nozzle assembly (200) to housing with nozzle bolts, washers (110) and spring washers (120). Tighten bolts to a torque value of seven to nine inch-pounds, then loosen and retighten bolts, observing torque value, to ensure nozzle assembly is properly seated. Lockwire bolts.
- (f) Install inner containment ring (180) on nozzle assembly (200) then thread cone assembly (70) on nozzle assembly and tighten until it bottoms against inner containment ring.
- (g) Install exhaust duct (80) into cone assembly (70) as shown in Detail B, Figure 607. Align bolt holes. If bolt holes cannot be aligned by slight tightening of cone assembly, back off to next hole.
- (h) Temporarily install thickness of plenum gaskets (30, figure 605) as required to obtain alignment of torus assembly (170) and plenum assembly (160). Install plenum assembly (60) onto engine, orienting combustor unit opening as shown in Detail B, Figure 607. Add or remove plenum gaskets (30, figure 605) as required to align liner assembly opening in torus assembly (170) with combustor unit opening in plenum assembly (60). Temporarily install combustor unit to assure proper torus assembly (170) plenum assembly (60) alignment.
- (i) Align exhaust duct (80) and plenum assembly (60) index marks made at disassembly, then measure gap between flanges of exhaust duct and plenum assemblies using a feeler gage. Measurement equals required thickness of plenum shims (90).
- (j) Remove temporarily installed combustor unit, plenum assembly (60) and plenum gasket (30).
- (k) Select thickness of plenum shims (90) determined in step (i).
- (l) Apply a light coat of adhesive (GE1276) to both sides of plenum gaskets (30) and potting compound (S-2007) to both sides of plenum shims (90). Install plenum gaskets (30), plenum shims (90) and plenum assembly (60). Align plenum assembly exhaust duct (80) as shown in Detail B, Figure 607.
- (m) Apply a light coat of high temperature compound (Fel-Pro C5-A) to threads of plenum assembly (60) and exhaust duct bolts (40, figure 605). Secure plenum assembly with plenum bolts (10) and washers (20). Tighten bolts to a torque value of 35 to 40 inch-pounds and lockwire.

R



MAINTENANCE MANUAL
GTCP30-92C(A)



I-19A-8502

R
R

Determining Compressor Seal Shim Requirements
Figure 606A

49-20-00
Page 626
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

4. G. (3) (n) Install exhaust gas thermocouple. (Refer to Section 49-70-22.)
- (o) Install pneumatic thermostat. (Refer to Section 49-50-04.)
- (p) Install combustor unit. (Refer to Section 49-20-04.)
- (q) Install and connect plumbing and electrical installation components. (Refer to Section 49-20-01.)

H. Testing

It is recommended that the following test and adjustment checks be accomplished after installation of the APU in the aircraft. (Refer to Section 49-20-00 ADJUSTMENT/TEST.)

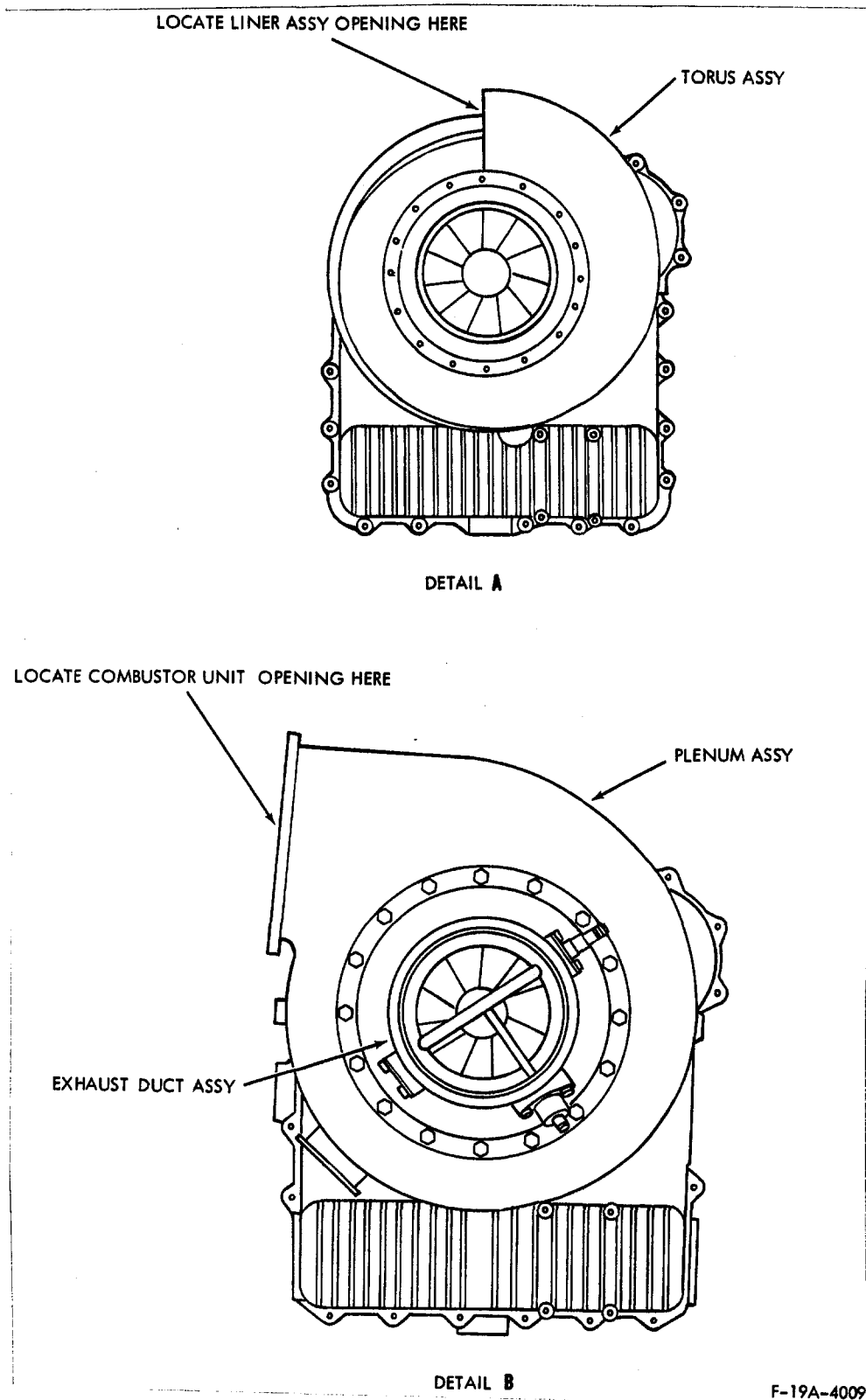
- (1) Fuel control unit acceleration limiter valve cracking pressure.
- (2) Engine start, acceleration, operation, and actuation of the automatic controls.
- (3) Fuel control unit governor settings.
- (4) Pneumatic thermostat settings.

I. Trouble Shooting

Refer to Trouble Shooting for applicable trouble shooting instructions.



MAINTENANCE MANUAL
GTCP30-92C(A)



Orientation of Torus and Plenum
Assemblies (Typical)
Figure 607



MAINTENANCE MANUAL
GTCP30-92C(A)

PLUMBING AND ELECTRICAL INSTALLATION

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
Removal/Installation	201



MAINTENANCE MANUAL
GTCP30-92C(A)

PLUMBING AND ELECTRICAL INSTALLATION - MAINTENANCE PRACTICES

1. Removal/Installation

Components of the plumbing and electrical installation may be removed and replaced as required in accordance with good shop practice. During removal, note should be made of the routing of tubing, hoses, and wiring harnesses and manner of attaching clamps for reference at reassembly. Plumbing fittings, lines, wiring harness connectors and terminals should be tagged as removed for aid at reinstallation.



MAINTENANCE MANUAL
GTCP30-92C(A)

COMBUSTION SECTION

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
Removal/Installation	201
Inspection/Check	203
Cleaning/Painting	204



MAINTENANCE MANUAL
GTCP30-92C(A)

COMBUSTION SECTION - MAINTENANCE PRACTICES

1. Removal/Installation

Table 201. Materials and Compounds

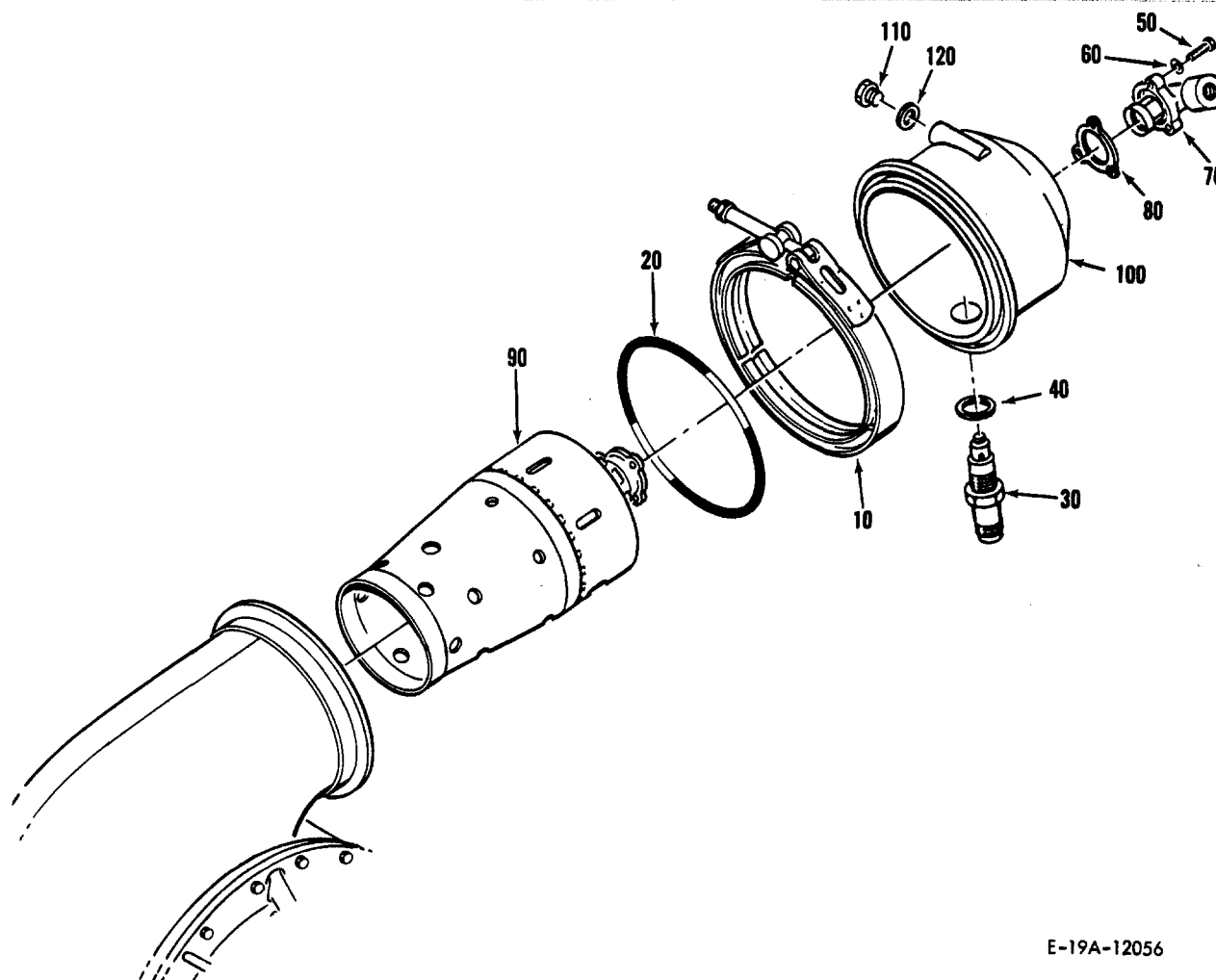
Material or Compound	Manufacturer
NOTE: Equivalent substitutes may be used for listed item.	
Rust stripper (Oakite Rustripper)	Oakite Products Inc, 50 Valley Rd, Berkeley Heights, NJ 07922

A. Remove Combustor Unit (See Figure 201)

- (1) Disconnect igniter plug lead from igniter plug (30).
- (2) Disconnect fuel hose assembly from fuel atomizer assembly (70).
- (3) Remove coupling clamp (10), then remove combustor unit (10 through 120) from engine. Remove and discard packing (20).
- (4) Disassemble combustor unit (10 through 120) as follows.
 - (a) Remove igniter plug (30) and gasket (40) from combustor cap (100). (Refer to Section 49-40-11.)
 - (b) Remove fuel atomizer assembly (70) from combustor cap (100). (Refer to Section 49-30-14.)
 - (c) Separate combustor cap (100) from combustion chamber liner (90).
 - (d) Remove plug (100) and packing (120) from combustor cap (100). Discard packing.



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12056

- 10. COUPLING CLAMP
- 20. PACKING
- 30. IGNITER PLUG
- 40. GASKET
- 50. BOLT
- 60. WASHER

- 70. FUEL ATOMIZER ASSY
- 80. GASKET
- 90. COMBUSTION CHAMBER LINER
- 100. COMBUSTOR CAP
- 110. PLUG
- 120. PACKING

Combustion Components Removal/Installation
Figure 201

49-20-04
Page 202
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

NOTE: Inspect hot section components prior to installing replacement combustor unit. Hot section components may be inspected through the opening in the turbine plenum assembly to the extent that the components are visible. The removed combustion chamber liner assembly shall be inspected for cracks, erosion, buckling and hot spots. If liner assembly damage is indicated, a closer examination of the engine hot section components should be undertaken to ensure that damage is limited to the liner assembly.

1. B. Install Combustor Unit (See Figure 201)

(1) Assemble combustor unit as follows.

- (a) Install plug (100) with new packing (120) into combustor cap (100).
 - (b) Position combustor cap (100) onto combustion chamber liner (90).
 - (c) Install fuel atomizer assembly (70) with gasket (80) onto combustor cap (100). (Refer to Section 49-30-14.)
 - (d) Install igniter plug (30) with gasket (40) into combustor cap (100). (Refer to Section 49-40-11.)
- (2) Install combustor unit with new packing (20) onto engine and secure with coupling clamp (10). Tighten coupling nut to a torque value of 10 to 20 inch-pounds.
- (3) Reconnect fuel hose assembly to fuel atomizer assembly (70).
- (4) Reconnect igniter plug lead to igniter plug (30).

2. Inspection/Check

A. General

The following methods and procedures can be accomplished by personnel who maintain the equipment in the field. A careful visual inspection shall precede any detail checks to eliminate unnecessary inspection procedures and to determine the extent of further checking. Long life and continued efficient operation of the engine depend upon the care and accuracy with which inspections are conducted.

B. Inspect Combustor Unit Components

- (1) Check igniter plug (30). (Refer to Section 49-40-11, Inspection/Check.)
- (2) Check fuel atomizer assembly (70). (Refer to Section 49-30-14, Inspection/Check.)



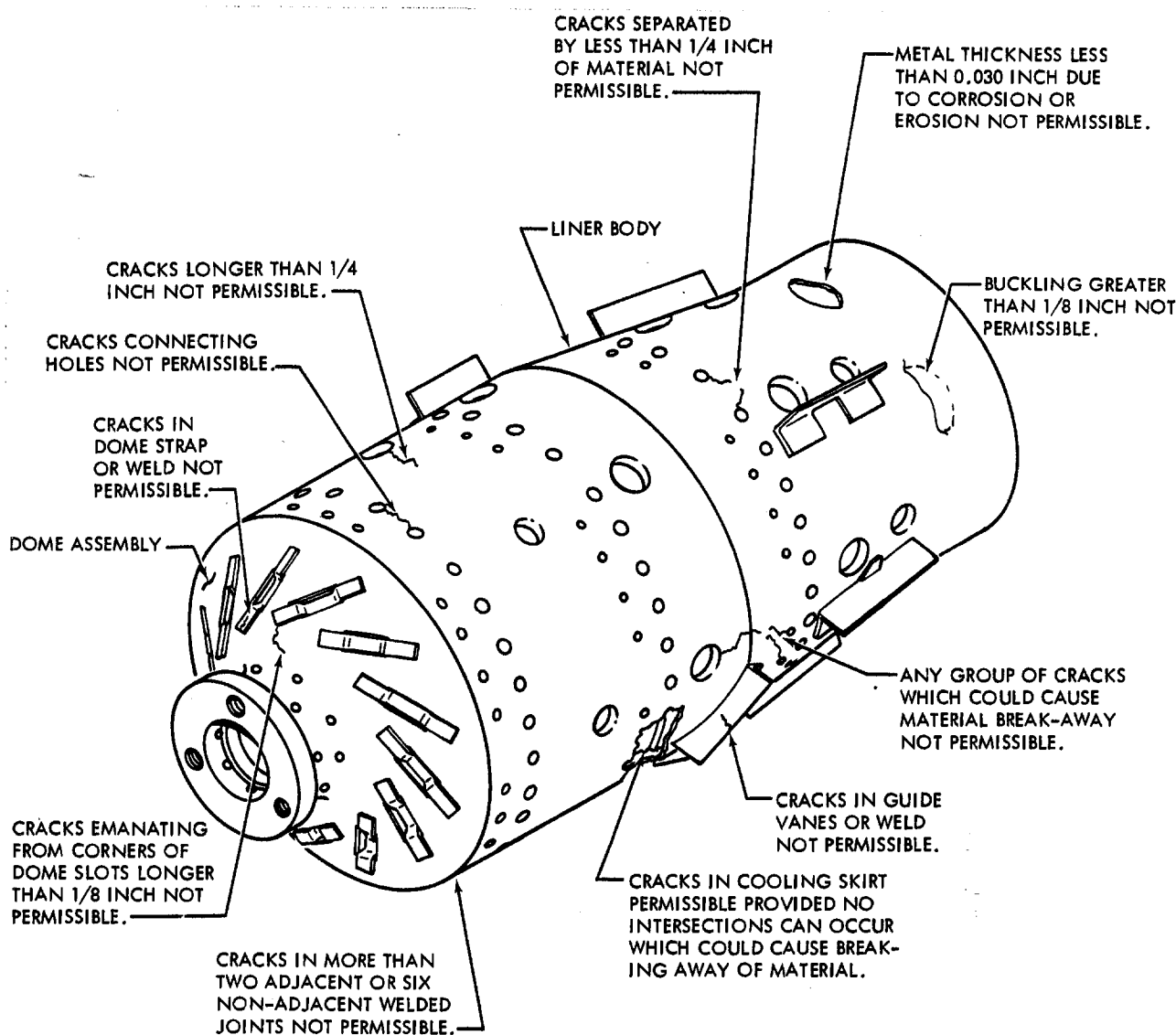
MAINTENANCE MANUAL
GTCP30-92C(A)

2. B. (3) Check combustor cap (100) for distortion, buckling, or obvious damage.
- (4) Check combustion chamber liner (90) in accordance with Figure 202.

NOTE: If cracks, erosion, deformation or other obvious hot section damage is evident during this inspection, remove engine from installation and perform a detailed hot section inspection. (Refer to Section 49-20-00, INSPECTION/CHECK.)

3. Cleaning/Painting

Clean combustion chamber liner (90, figure 201) of carbon deposits by immersing in rust stripper (Oakite Rustripper).



Combustion Chamber Liner Assembly Inspection/Check
Figure 202

I-19A-30095

49-20-04
Page 204
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

OUTPUT SHAFT SEAL

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
Removal/Installation	201
Inspection/Check	203



MAINTENANCE MANUAL
GTCP30-92C(A)

OUTPUT SHAFT SEAL - MAINTENANCE PRACTICES

1. Removal/Installation

Table 201. Materials and Compounds

Material or Compound	Manufacturer
<u>NOTE:</u> Equivalent substitutes may be used for listed item.	
Adhesive (C111 Stabond)	Stabond Corp, 14010 South Western Ave, Gardena, CA 90249

A. Remove Output Shaft Seal (See Figure 201)

- (1) Remove screws (10), washers (20), and retainer (30) with stator (60) installed. Press stator from retainer. Remove packing (40). Discard packing and stator.
- (2) Bend tab of key (90) to free output shaft nut (80), then remove output shaft nut, using Adapter Wrench Part No. 280377 to lock gear train and Spanner Wrench Part No. 253562-2 to loosen output shaft nut. Lift out rotor (70) and discard.

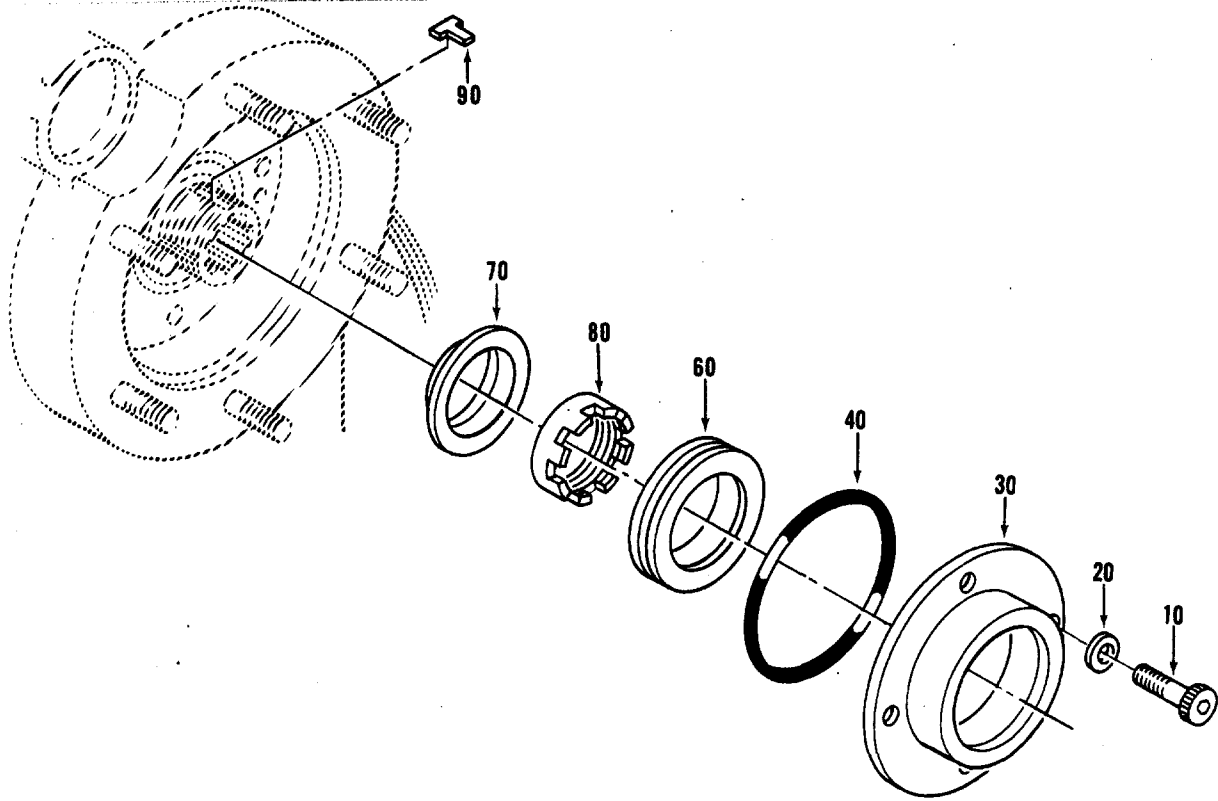
B. Install Output Shaft Seal (See Figure 201)

NOTE: Output shaft stator (60) and rotor (70) must be installed as a matched set. Do not replace separately.

- (1) Install new rotor (70) on output shaft with tapered face of rotor toward bearing.
- (2) Install output shaft nut (80) on shaft using Adapter Wrench Part No. 280377 to lock gear train and Spanner Wrench Part No. 253562-2 to tighten output shaft nut to a torque value of 300 to 375 inch-pounds. Note key slot in shaft that aligns with key slot in output shaft nut. Remove output shaft nut.



MAINTENANCE MANUAL
GTCP30-92C(A)



- 10. SCREW
- 20. WASHER
- 30. RETAINER
- 40. PACKING

- 60. STATOR
- 70. ROTOR
- 80. NUT
- 90. KEY

Output Shaft Seal Removal/Installation
Figure 201

49-20-05
Page 202
May 28/82

TEMPORARY REVISION NO. 49-7

To holders of Pneumatic and Shaft Power Gas Turbine Engine Maintenance Manual Report No. 49-23-23, Revision 1, dated May 11, 1987. Insert facing page 203/204, 49-20-05.

Reason: To add inspection criteria for the internal splines on the output shaft.

2. C. Inspect Output Shaft

- (1) Visually check internal splines for cracks, galling, sharp knife edges and radial scoring. No cracks, galling, sharp knife edges or radial scoring is allowed.
- (2) Return APU to an authorized overhaul facility if the output shaft fails to meet inspection requirement.

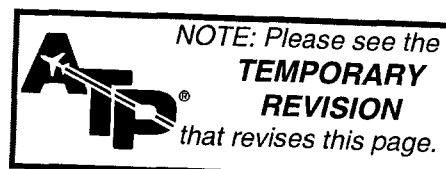


MAINTENANCE MANUAL
GTCP30-92C(A)

Table 202. Special Tools, Fixtures and Equipment

Nomenclature	Use	Source/ Part No.
NOTE: Equivalent substitutes may be used for listed items.		
Spanner Wrench	For tightening or loosening the output shaft nut.	253562-2
Adapter Wrench	Hold accessory shaft from rotating.	280377
Seal Driver	Used to press carbon seal into the seal retainer.	281728-1

1. B. (3) Install key (90) into slot in shaft noted in step (2). Install output shaft nut (80) on shaft and using Adapter Wrench Part No. 280377, and Spanner Wrench Part No. 253562-2 tighten output shaft nut to a torque value of 300 to 375 inch-pounds. Bend key into slot in output shaft nut.
 - (4) Coat flat face of stator (60) with adhesive (C111 Stabond). Using Seal Driver Part No. 281728-1, install seal into retainer (30). Flat face of seal shall be installed into retainer.
 - (5) Place new packing (40) into packing groove in retainer (30), and install retainer, with stator (60) and packing. Secure retainer with washers (20) and screws (10).
2. Inspection/Check
 - A. Inspect Retainer (30)
 - (1) Inspect retainer (30) bore for excessive gouges or other damage which would affect sealing of stator (60). Inspect retainer flanges for distortion.
 - B. Inspect Output Shaft Nut (80)
 - (1) Inspect output shaft nut (80) for damaged threads, slots, or gouges on seal-contacting face.





MAINTENANCE MANUAL
GTCP30-92C(A)

ENGINE FUEL AND CONTROL SECTION

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>CHAPTER/ SECTION/ SUBJECT</u>	<u>PAGE</u>
R DESCRIPTION AND OPERATION	49-30-00	
FUEL ATOMIZER ASSEMBLY	49-30-14	
FUEL SOLENOID VALVE	49-30-15	
FUEL CHECK VALVE	49-30-16	
FUEL DRAIN VALVE	49-30-19	
FUEL CONTROL UNIT ASSEMBLY	49-30-20	

REFER TO APPLICABLE CHAPTER/SECTION/SUBJECT FOR EXPANDED CONTENTS



MAINTENANCE MANUAL
GTCP30-92C(A)

ENGINE FUEL AND CONTROL SECTION - DESCRIPTION AND OPERATION

1. General

The engine fuel system is fully automatic in operation, maintaining a constant turbine operating speed under varying loads, and does not require external controls. A source of specified fuel and electrical power is required.

2. Description

The system consists of a fuel control unit with integral filter element, pump, and control devices, mounted on the front of the gearcase housing assembly, a fuel solenoid valve mounted on a bracket on top of the gearcase housing assembly, a fuel atomizer mounted on the turbine section combustor cap assembly, an overtemperature thermostat mounted in the turbine exhaust flange (Refer to Section 49-50-00), a fuel drain valve mounted at the bottom of the turbine plenum, and the necessary plumbing and wiring.

3. Operation

When clean, pressurized fuel is delivered to the fuel control unit inlet and the engine started, fuel is pumped by the fuel control unit gear pump through a filter element to the fuel solenoid valve. The fuel solenoid valve is automatically opened by a customer-furnished relay and permits fuel flow to the check valve attached to the fuel atomizer assembly. As fuel pressure increases to above five psig the check valve opens and permits fuel to the fuel atomizer assembly. Low-pressure fuel passes through the primary orifices in the fuel atomizer assembly and is sprayed into the combustion chamber. As fuel pressure increases beyond the flow divider pressure setting, fuel passes through both primary and secondary orifices in the fuel atomizer assembly to provide adequate fuel spray. (See figure 2, 49-20-00.)

Fuel flow during acceleration is metered by the start pressure (acceleration limiter) valve in the fuel control unit to provide smooth acceleration; fuel flow during normal speed operation is metered by the governor in the fuel control unit to maintain constant speed. Additionally, fuel flow at overtemperature conditions is modulated by action of the overtemperature thermostat which bleeds control air from the start pressure (acceleration limiter) valve in the fuel control unit. Fuel flow during sudden load changes is modulated by a minimum flow valve and a differential pressure bypass valve.

Small quantities of fuel which may collect in the bottom of the turbine plenum are drained through the normally open fuel drain valve. During engine operation the valve is closed by compressor air pressure in the plenum.



MAINTENANCE MANUAL
GTCP30-92C(A)

FUEL ATOMIZER ASSEMBLY

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
Removal/Installation	201
Adjustment/Test	205
Cleaning/Painting	203
Inspection/Check	205



MAINTENANCE MANUAL
GTCP30-92C(A)

FUEL ATOMIZER ASSEMBLY - MAINTENANCE PRACTICES

1. Removal/Installation

Table 201. Materials and Compounds

Material or Compound	Manufacturer
<u>NOTE:</u> Equivalent substitutes may be used for listed items.	
Dry nitrogen	Commercially available
High temperature compound (Fel-Pro C5-A)	Fel-Pro Inc, Div of Felt Products Mfg Co, 7450 N McCormick Blvd, Skokie, IL 60076
Soft brass bristled brush	Commercially available
Solvent, Stoddard (Federal Specification P-D-680, Type I)	Commercially available

A. Remove Fuel Atomizer Assembly (See Figure 201)

- (1) Disconnect fuel inlet line.

NOTE: Refer to Report No. 49-30-39 for functional test or overhaul of fuel atomizer assembly.

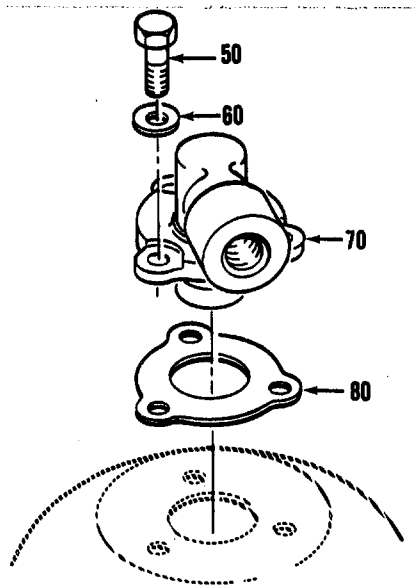
- (2) Remove bolts (50) and washers (60), separate fuel atomizer assembly (70) from combustor cap. Remove and discard gasket (80).

B. Install Fuel Atomizer Assembly (See Figure 201)

- (1) Coat threads of bolts (50) with high temperature compound (Fel-Pro C5-A).



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12060

50. BOLT
60. WASHER

70. FUEL ATOMIZER ASSY
80. GASKET

Fuel Atomizer Assembly Removal/Installation
Figure 201

49-30-14
Page 202
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

1. B. (2) Install gasket (80) on mounting boss of combustor cap assembly, then install fuel atomizer assembly (70) and secure with washers (60) and bolts (50). Lockwire bolts.
- (3) Install check valve as described in Section 49-30-16.
- (4) Reconnect fuel inlet line.

2. Adjustment/Test

- A. Refer to Report No. 49-30-39 for adjustment/test of fuel atomizer assembly.

3. Cleaning/Painting

NOTE: See ADJUSTMENT/TEST for Operational Test and Trouble Shooting to establish condition of unit. This is to determine the actual need for disassembly of the fuel atomizer.

A. Disassemble Fuel Atomizer Assembly (See Figure 202)

- (1) Install atomizer assembly in Atomizer Holder Part No. 253680.

NOTE: Disassembly of the fuel atomizer (10) is not recommended.

- (2) Bend protruding edges of washer (20) and remove fuel atomizer (10) from fuel atomizer housing (30). Discard washer (20).
- (3) Remove fuel atomizer housing (30) from Atomizer Holder Part No. 253680.
- (4) Remove check valve as described in Section 49-30-16.

B. Clean Fuel Atomizer Assembly

NOTE: To ensure both primary and secondary orifices are open a minimum of 75 psig must be applied to fuel atomizer.

- (1) Attach a low pressure dry air or dry nitrogen source (75 to 100 psig) to atomizer inlet port. Flow air or nitrogen through atomizer while cleaning. Clean atomizer using soft brass bristled brush.
- (2) Degrease parts with solvent, Stoddard (Federal Specification P-D-680, Type I) as follows.

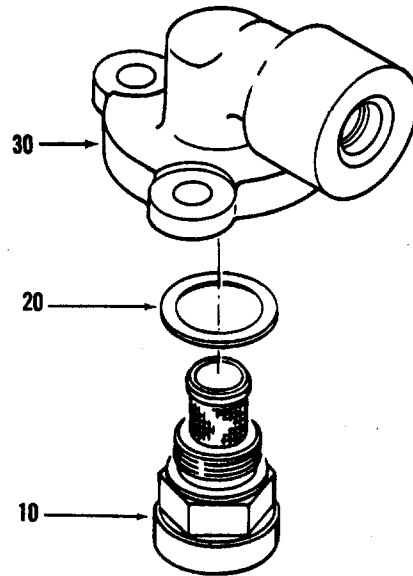
WARNING: SPRAY VAPORS ARE TOXIC AND SHALL NOT BE INHALED. OBSERVE ALL FIRE PRECAUTIONS.

NOTE: Ensure flow through atomizer blows contaminants away from atomizer face.



MAINTENANCE MANUAL
GTCP30-92C(A)

3. B. (3) (a) Place solvent in a dip tank or use as a spray in a positive outside ventilated spray booth.
- (b) Dip, soak, agitate or spray parts to be cleaned until oil and grease have been removed.



E-55G-223

10. FUEL ATOMIZER
20. LOCK WASHER

30. FUEL ATOMIZER HOUSING

Typical Fuel Atomizer Assembly (Typical)
Figure 202

49-30-14
Page 204
May 11/87



MAINTENANCE MANUAL
GTC30-92C(A)

3. B. (2) (c) Remove soft carbon deposits using a soft brass bristled brush.
- (3) Clean screen of fuel atomizer (10, figure 202) thoroughly with solvent, Stoddard (Federal Specification P-D-680, Type I) and dry with clean, dry compressed air (20 psig maximum).

C. Assemble Fuel Atomizer Assembly (See Figure 202)

- (1) Install fuel atomizer housing (30) in Atomizer Holder Part No. 253680.
- (2) Install new washer (20) and fuel atomizer (10) into fuel atomizer housing (30). Tighten fuel atomizer to torque value of 140 to 150 inch-pounds. Bend edges of washer (20) up against hex of fuel atomizer (10) and down against flat of fuel atomizer housing (30).
- (3) Install fuel check valve according to Section 49-30-16.
- (4) Remove assembled atomizer assembly from Atomizer Holder Part No. 253680.

4. Inspection/Check

A. Follow General Inspection Instructions

- (1) Inspect all metallic parts for corrosion, wear, nicks, cracks, burrs, and scratches.
- (2) Inspect threaded parts for worn, crossed, stripped, or peened threads, and for dirt or obstruction in threads. Make certain that all threaded parts turn freely on their mating parts and do not bind.

B. Inspect Fuel Atomizer Assembly (See Figure 202)

- (1) Inspect orifices in atomizer for burrs or roughness on orifice edges, using a 20-power microscope. Any evidence of burrs or roughness is cause for replacement.
- (2) Inspect screen in atomizer for damage. Damage to screen is cause for replacement.



MAINTENANCE MANUAL
GTCP30-92C(A)

Table 1001. Special Tools, Fixtures and Equipment

Nomenclature	Use	Source/ Part No.
<u>NOTE:</u> Equivalent substitutes may be used for listed items.		
Atomizer Holder	Hold atomizer during disassembly and assembly.	253680



MAINTENANCE MANUAL
GTCP30-92C(A)

FUEL SOLENOID VALVE

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
Removal/Installation	201
Inspection/Check	201



MAINTENANCE MANUAL
GTCP30-92C(A)

FUEL SOLENOID VALVE - MAINTENANCE PRACTICES

1. Removal/Installation

Table 201. Materials and Compounds

Material or Compound	Manufacturer
<u>NOTE:</u> Equivalent substitutes may be used for listed item.	
Test fluid (MIL-F-7024A, Type II)	Commercially available

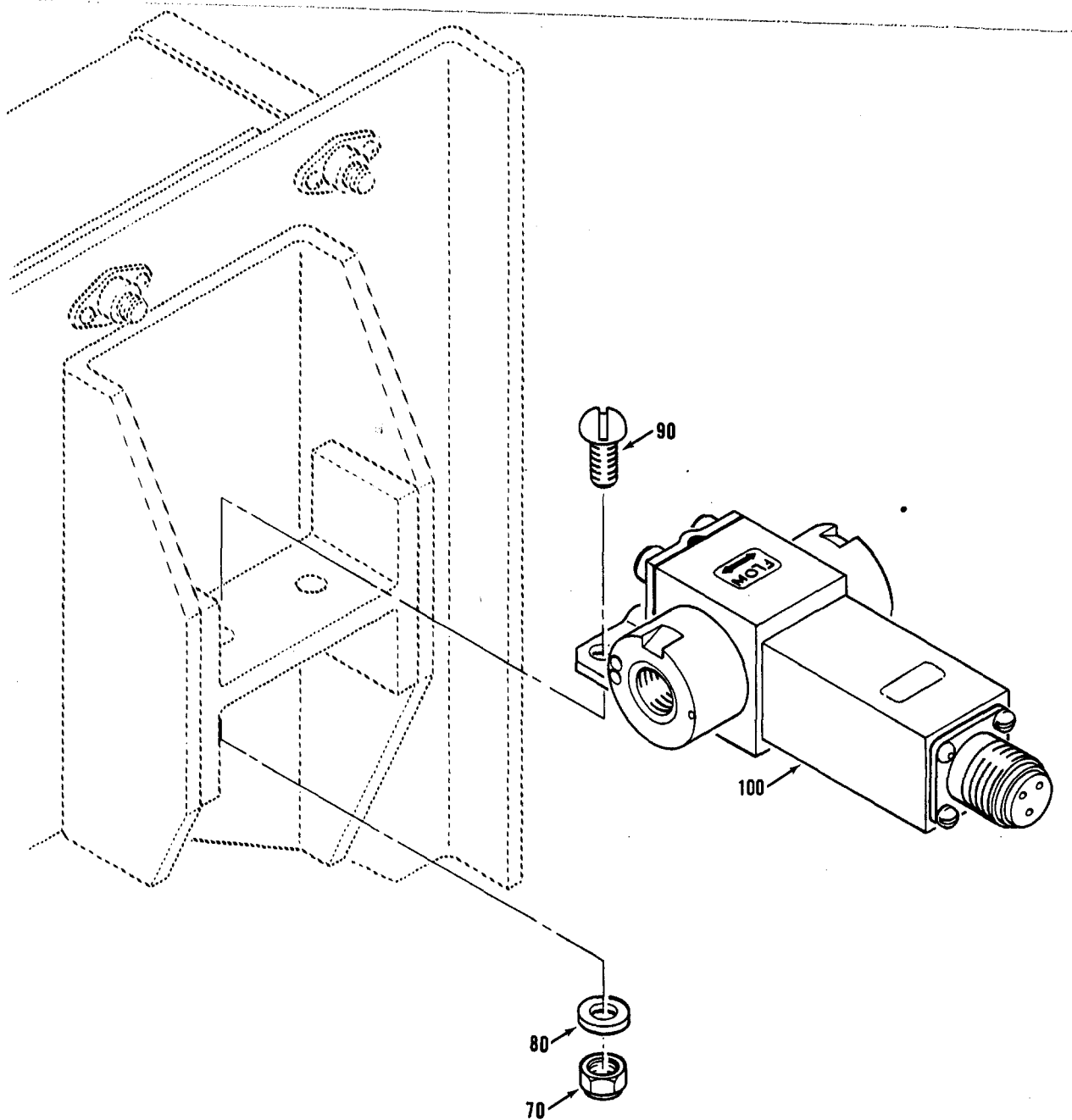
- A. Remove Fuel Solenoid Valve (100) (See Figure 201)
 - (1) Disconnect harness assembly and fuel lines.
 - (2) Remove nuts (70), washers (80), and screws (90), then separate fuel solenoid valve (100) from mounting bracket.
 - (3) Remove unions with packings from fuel solenoid valve (100). Remove and discard packings.
- B. Install Fuel Solenoid Valve (100) (See Figure 201)
 - (1) Assemble new packings onto unions and install unions in fuel solenoid valve (100).
 - (2) Position fuel solenoid valve (100) on mounting bracket, and secure with screws (90), washers (80), and nuts (70).
 - (3) Reconnect harness assembly and fuel lines.

2. Inspection/Check

- A. Inspect Fuel Solenoid Valve (100)
 - (1) Inspect for crossed, stripped or peened threads.
 - (2) Inspect electrical connector for bent, broken or burned pins.
 - (3) Inspect solenoid for security of mounting.
- B. Check Fuel Solenoid Valve (100)
 - (1) Connect a regulated source of test fluid (MIL-F-7024A, Type II) to fuel solenoid valve.



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12237

70. NUT
80. WASHER

90. SCREW
100. FUEL SOLENOID VALVE

Fuel Solenoid Valve Removal/Installation
Figure 201

49-30-15
Page 202
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

2. B. (2) Apply a source of electrical power (0 to 30 vdc) to fuel solenoid valve.
- (3) Adjust test fluid pressure to 100 +3/-3 psig.
- (4) Adjust electrical power source to input 12 volts dc to fuel solenoid valve. Valve shall open.
- (5) Reduce input voltage to five volts dc. Valve shall close.
- (6) Increase test fluid pressure to fuel solenoid valve to a value of 300 +5/-5 psig.
- (7) Apply an input voltage of 16 volts dc to fuel solenoid valve. Valve shall open.
- (8) Decrease input voltage to five volts dc. Valve shall close.
- (9) Check leakage through valve. Leakage shall not exceed 0.5 cc per hour.
- (10) Remove electrical power source and regulated test fluid from fuel solenoid valve.



MAINTENANCE MANUAL
GTCP30-92C(A)

FUEL CHECK VALVE

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
Removal/Installation	201
Inspection/Check	201
Cleaning/Painting	201



MAINTENANCE MANUAL
GTCP30-92C(A)

FUEL CHECK VALVE - MAINTENANCE PRACTICES

1. Removal/Installation

Table 201. Materials and Compounds

Material or Compound

Manufacturer

NOTE: Equivalent substitutes may be used for listed item.

Solvent, Stoddard (Federal
Specification P-D-680, Type I)

Commercially available

A. Remove Fuel Check Valve (240) (See Figure 201)

(1) Remove fuel inlet line.

(2) Remove fuel check valve (240) and packing (250) from fuel atomizer assembly. Discard packing (250).

B. Install Fuel Check Valve (240) (See Figure 201)

(1) Assemble a new packing (250) on fuel check valve (240) and install fuel check valve (240) into fuel atomizer assembly.

(2) Reconnect fuel inlet line.

2. Inspection/Check

A. Inspect Check Valve

(1) Inspect for crossed, peened, or stripped threads.

(2) Inspect for general condition and freedom from damage.

B. Check Valve

(1) Apply five psig air pressure to valve inlet. Valve shall open.

(2) Decrease inlet air pressure to two psig. Valve shall close.

(3) Replace check valve not meeting inspection/check requirements.

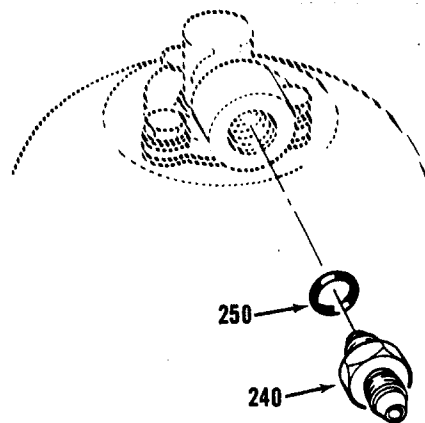
3. Cleaning/Painting

A. Clean Check Valve

(1) Clean check valve by immersing in solvent, Stoddard (Federal Specification P-D-680, Type I). Blow dry with clean, compressed air.



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12238

240. CHECK VALVE

250. PACKING

Fuel Check Valve Removal/Installation
Figure 201

49-30-16
Page 202
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

FUEL DRAIN VALVE

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
Removal/Installation	201
Inspection/Check	201
Cleaning/Painting	202



MAINTENANCE MANUAL
GTCP30-92C(A)

FUEL DRAIN VALVE - MAINTENANCE PRACTICES

1. Removal/Installation

Table 201. Materials and Compounds

Material or Compound	Manufacturer
<u>NOTE:</u> Equivalent substitutes may be used for listed item.	
Solvent, Stoddard (Federal Specification P-D-680, Type I)	Commercially available

A. Remove Fuel Drain Valve (10) (See Figure 201)

- (1) Remove fuel drain valve (10) with packing (20). Discard packing (20).

B. Install Fuel Drain Valve (See Figure 201)

- (1) Assemble new packing (20) onto fuel drain valve (10), and install fuel drain valve (10). Position fuel drain valve (10) with arrow pointed away from turbine plenum.

2. Inspection/Check

A. Inspect Fuel Drain Valve

- (1) Inspect for crossed, peened or stripped threads.
- (2) Inspect for general condition and obvious damage.

B. Check Fuel Drain Valve

- (1) Connect a source of regulated air (0 to 20 psig) to fuel drain valve inlet.
- (2) Regulate inlet air pressure to eight psig, valve shall be open.
- (3) Slowly increase inlet air pressure to valve to 15 psig. Valve shall close before inlet air pressure reaches 15 psig.
- (4) Decrease inlet air pressure to eight psig. Valve shall open.

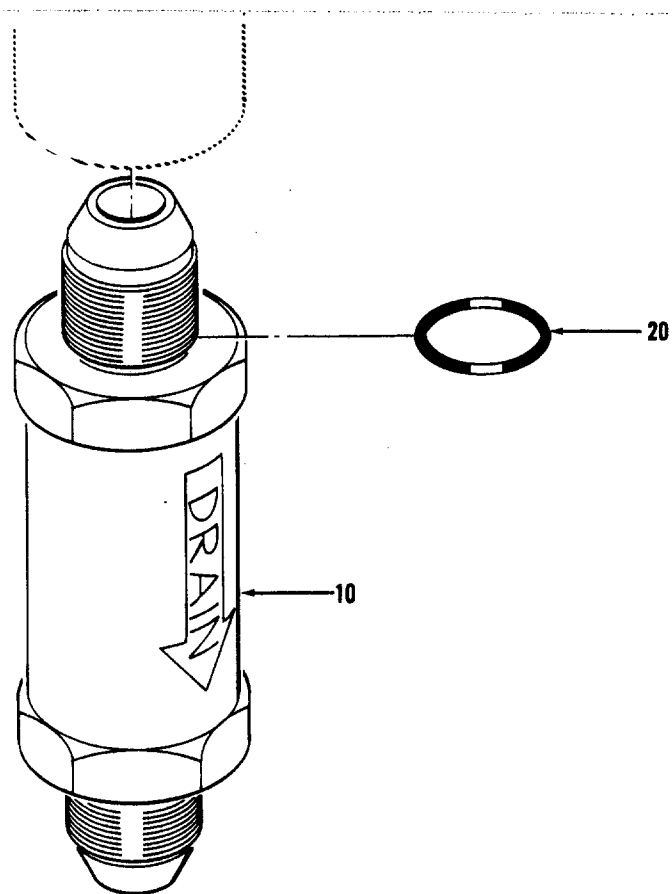


MAINTENANCE MANUAL
GTCP30-92C(A)

3. Cleaning/Painting

A. Clean Fuel Drain Valve

- (1) Clean fuel drain valve by immersing in solvent, Stoddard (Federal Specification P-D-680, Type I). Dry fuel drain valve by blowing dry with clean compressed air.



E-19A-12239

10. VALVE

20. PACKING

Fuel Drain Valve Removal/Installation
Figure 201

49-30-19
Page 202
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

FUEL CONTROL UNIT ASSEMBLY

<u>SUBJECT</u>	<u>PAGE</u>
Removal/Installation	201
Adjustment/Test	203



MAINTENANCE MANUAL
GTCP30-92C(A)

FUEL CONTROL UNIT ASSEMBLY - MAINTENANCE PRACTICES

1. Removal/Installation

Table 201. Materials and Compounds

Material or Compound	Manufacturer
<u>NOTE:</u> Equivalent substitutes may be used for listed items.	
R Grease (Mobil 29) (MIL-G-81827) R (Molybdenum-Disulphide)	Mobil Oil Corp, P.O. Box 3311, Beaumont, TX 77704
R Grease (MIL-G-21164)	Commercially available
R Jointing compound R (Hylomar PL32H) R	Van Dusen Air Incorporated, Aircraft Supplies Division, 311 South 32nd St, Phoenix, AZ 85034

A. Remove Fuel Control Unit Assembly (See Figure 201)

- (1) Disconnect fuel control discharge line and control air line from fuel control assembly.
- (2) Remove nuts (20) and washers (30).

R NOTE: Fuel control assembly splined shaft (60) and insulator (40) are loose and must be kept with fuel control assembly at all times.

R (3) Remove fuel control assembly (10, 40, 60) and gasket (130) from
R studs on engine gearbox housing.

R (4) Remove gasket (50) from fuel control assembly. Discard gasket.

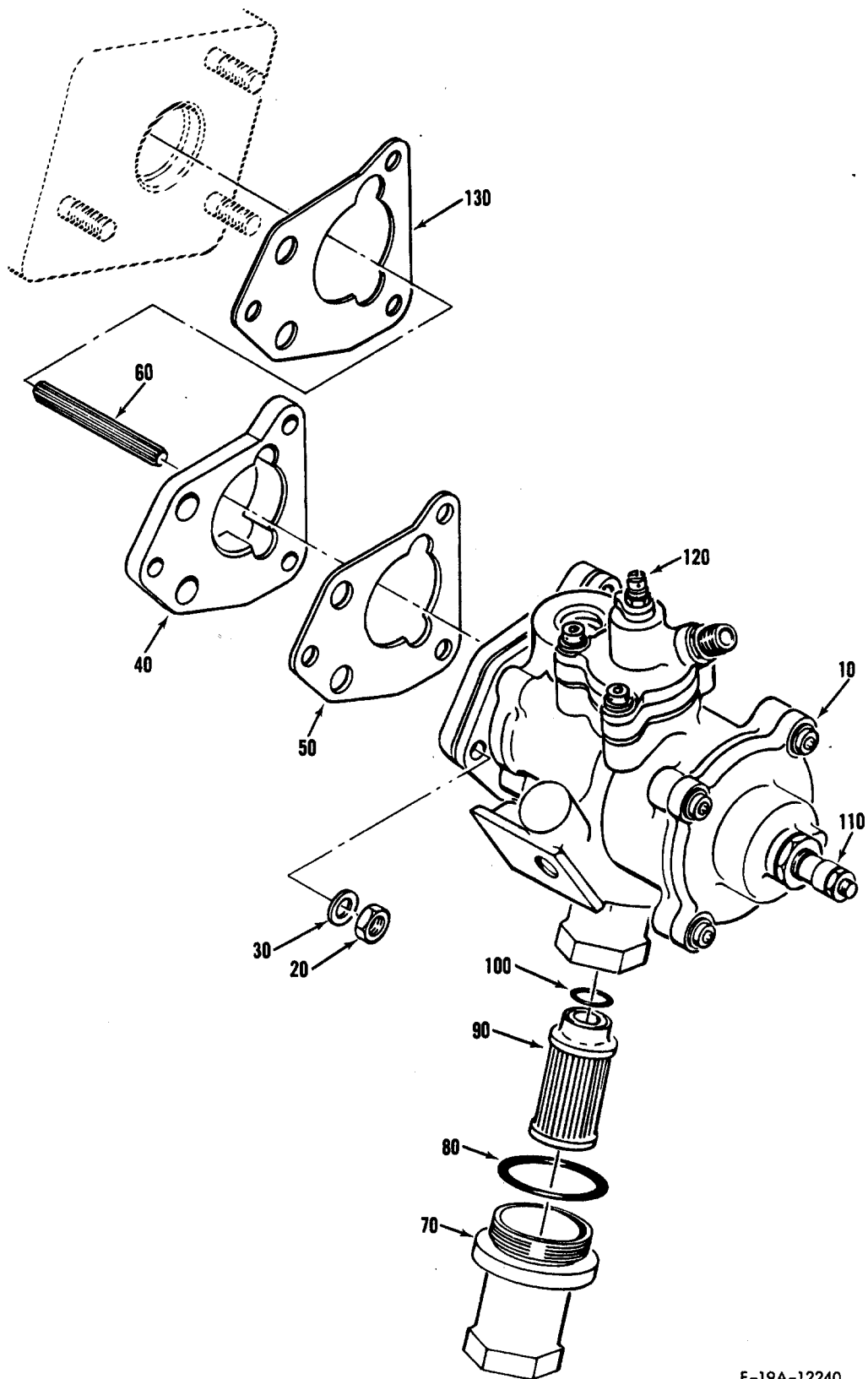
B. Install Fuel Control Unit Assembly (See Figure 201)

R NOTE: Prior to installing splined shaft (60) into fuel control unit and engine assembly, check that both engine assembly and fuel control unit female splines are cleaned of old grease and ensure each end of splined shaft (60) is coated with grease (Mobil 29, MIL-G-81827) or grease (MIL-G-21164).

R (1) Lubricate each end of splined shaft (60) with a heavy coat of
R grease (Mobil 29, MIL-G-81827 or Royco 130, MIL-G-25013D). Assem-
R ble splined shaft (60, figure 201), new gasket (50), and insulator (40) onto fuel control unit.



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12240

Fuel Control Unit Removal/Installation
Figure 201

49-30-20
Page 202
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

1. B. (2) Coat both sides of gasket (130) with jointing compound (Hylomer PL32H). Install gasket (130) and fuel control assembly (10, 40, 60) over studs on gearbox housing and secure with washers (30) and nuts (20).
- (3) Reconnect fuel control discharge line and control air line to fuel control assembly.
- C. Remove Filter Element (See Figure 201)
 - (1) Remove cap (70) with packing (80) from fuel control unit (10). Remove and discard packing (80).
 - (2) Remove filter element (90) with packing (100) from fuel control unit (10). Discard packing (100) and filter element (90).
- D. Install Filter Element (See Figure 201)
 - (1) Assemble new packing (100) into filter element (90). Install filter element (90) into bottom of fuel control unit (10).
 - (2) Assemble new packing (80) on cap (70), and install cap (70) over filter element (90) and onto fuel control unit (10). Lockwire cap (70).

2. Adjustment/Test

Refer to Section 49-20-00 ENGINE - ADJUSTMENT/TEST.

◀ KEY TO FIGURE 201

10. FUEL CONTROL UNIT	80. PACKING
20. NUT	90. ELEMENT
30. WASHER	100. PACKING
40. INSULATOR	110. GOVERNOR ADJUSTING SCREW
50. GASKET	120. START FUEL (ACCELERATION LIMITER) ADJUSTING SCREW
60. SHAFT	130. GASKET
70. CAP	



MAINTENANCE MANUAL
GTCP30-92C(A)

IGNITION/STARTING SECTION

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>CHAPTER/ SECTION/ SUBJECT</u>	<u>PAGE</u>
R DESCRIPTION AND OPERATION	49-40-00	
R IGNITER PLUG LEAD	49-40-10	
IGNITER PLUG	49-40-11	
IGNITION UNIT	49-40-13	

REFER TO APPLICABLE CHAPTER/SECTION/SUBJECT FOR EXPANDED CONTENTS



MAINTENANCE MANUAL
GTCP30-92C(A)

IGNITION/STARTING SECTION - DESCRIPTION AND OPERATION

1. General

The ignition/starting system is fully automatic in operation; however a 28 volt dc power source, starter-generator and controls are required.

2. Description

The system consists of an ignition unit mounted on a bracket on top of the gearcase housing assembly and an igniter plug mounted into the combustion cap assembly.

3. Operation

When the APU master switch and the start switch are placed in the on position the starter-generator begins rotating the engine gear train and the turbine and compressor components. Ignition starts, as acceleration begins and the fuel solenoid valve opens as the engine accelerates through five percent rotating group speed. When generator output voltage exceeds battery voltage the current transformer senses the reverse current and shuts off starting power to the starter-generator and ignition unit. The engine at this point is self-sustaining.



MAINTENANCE MANUAL
GTCP30-92C(A)

R

IGNITER PLUG LEAD

R

TABLE OF CONTENTS

R SUBJECT

PAGE

R Removal/Installation

201

R Inspection/Check

201

R Cleaning/Painting

203

R Adjustment/Test

203



MAINTENANCE MANUAL
GTCP30-92C(A)

R IGNITER PLUG LEAD - MAINTENANCE PRACTICES

R 1. Removal/Installation

R Table 201. Materials and Compounds

R Material or Compound	Manufacturer
------------------------	--------------

R NOTE: Equivalent substitutes may be used for listed item.

R Methyl-ethyl-ketone (MEK)	Commercially available
R (Federal Specification TT-M-261)	

R A. Remove Igniter Plug Lead (See Figure 201)

R (1) Disconnect ignition plug lead (10) from igniter plug and ignition
R unit.

R B. Install Igniter Plug Lead (See Figure 201)

R (1) Connect igniter plug lead (10) to igniter plug and to ignition
R unit. Tighten both ends of igniter plug lead to a torque value of
R 35 inch-pounds.

R 2. Inspection/Check

R A. Inspect Igniter Plug Lead

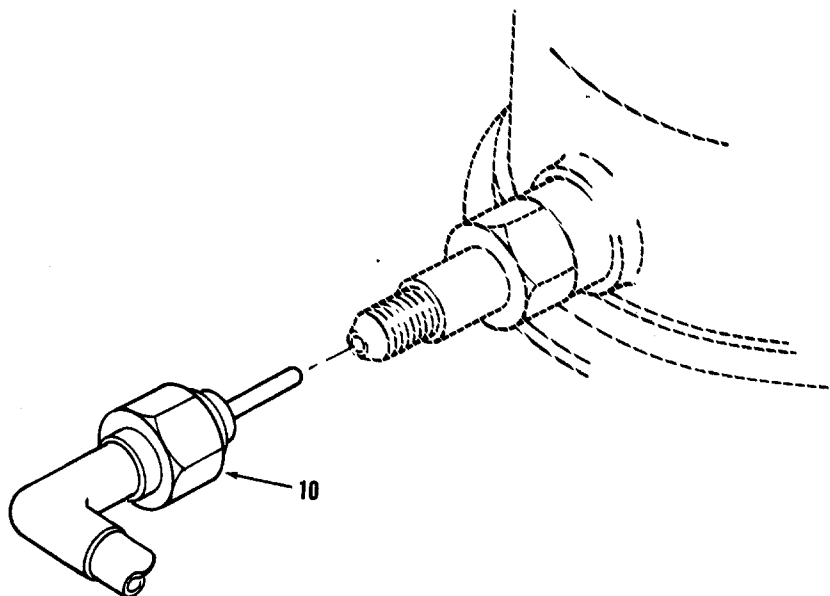
R (1) Visually inspect coupling nut for cracks, corrosion, and crossed,
R stripped, galled, or worn threads, and rounded wrenching flats. No
R damage permitted.

R (2) Visually inspect teflon on silicone grommet that surrounds insula-
R tors for cracks and distortion. No damage permitted.

R (3) Visually inspect outer shielding for chafing. Check for cracks or
R separation between shielding and terminal end. No damage
R permitted.



MAINTENANCE MANUAL
GTCP30-92C(A)



E-55G-426

10. IGNITER PLUG LEAD

Igniter Plug Lead Removal/Installation
Figure 201

49-40-10
Page 202
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

- R 2. A. (4) Visually inspect both end connectors for signs of arcing or
R pitting. No arcing or pitting permitted.
- R (5) Check connector contact tension at each end by installing connector
R contacts over igniter plug without installing retaining nuts. A
R resistance should be felt while sliding igniter plug lead back off.
R If resistance is not felt, the igniter plug lead shall be replaced.
- R (6) Replace igniter plug lead if inspection requirements are not met.
- R 3. Cleaning/Painting
- R A. Clean Igniter Plug Lead
- R (1) Wipe igniter plug lead with lint free cloth dipped in methyl-ethyl-
R ketone (Federal Specification TT-M-261).
- R (2) Clean igniter plug lead connectors with dry soft bristled brush.
R Remove oily type soil with cotton swabs dipped in methyl-ethyl-
R ketone (Federal Specification TT-M-261).
- R 4. Adjustment/Test
- R A. Test Igniter Plug Lead
- R (1) (Method) Connect megohm meter between igniter plug wire and
R conduit. A commercially available megohm meter may be used. Insu-
R lation resistance should be 25 megohms minimum.



MAINTENANCE MANUAL
GTCP30-92C(A)

IGNITER PLUG

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
Removal/Installation	201
Inspection/Check	201
Cleaning/Painting	202



MAINTENANCE MANUAL
GTCP30-92C(A)

IGNITER PLUG - MAINTENANCE PRACTICES

1. Removal/Installation

Table 201. Materials and Compounds

Material or Compound	Manufacturer
NOTE: Equivalent substitutes may be used for listed items.	
High temperature compound (Fel-Pro C5-A)	Fel-Pro Inc, Div of Felt Products Mfg Co, 7450 N McCormick Blvd, Skokie, IL 60076
Solvent, Stoddard (Federal Specification P-D-680, Type I)	Commercially available

A. Remove Igniter Plug (See Figure 201)

- (1) Disconnect ignition lead.
- (2) Remove igniter plug (30) with gasket (40) from mounting boss on combustor cap. Remove and discard gasket.

B. Install Igniter Plug (See Figure 201)

- (1) Apply a coat of high temperature compound (Fel-Pro C5-A) to threads of igniter plug (30), install new gasket (40) on plug, then thread igniter plug (30) with gasket (40) into mounting boss of combustor cap.

2. Inspection/Check

A. Inspect Igniter Plug

- (1) Inspect ceramic parts of plug for cracks or chipping.
- (2) Inspect electrodes for erosion. Clean if necessary.
- (3) Electrode shall have an outside diameter of 0.10 inch or greater at the narrowest cross-section and shall protrude beyond the ceramic insulator at least 0.020 inch. Gap between electrode and outer shell shall be 0.250 inch or less at closest point.



MAINTENANCE MANUAL
GTCP30-92C(A)

2. B. Check Igniter Plug

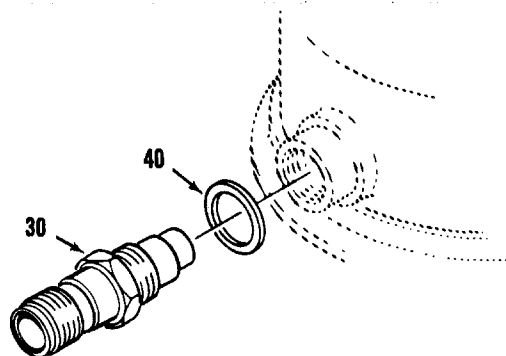
WARNING: DO NOT TOUCH OR PLACE HAND NEAR BASE OF IGNITER PLUG WHILE IGNITION UNIT IS ACTIVATED. DANGEROUSLY HIGH VOLTAGE IS PRESENT. MAKE CERTAIN NO VOLATILE FLUIDS OR GASES ARE PRESENT.

- (1) Connect a 24 volt dc power supply to a satisfactory ignition unit and lead to supply the igniter plug and check that plug has a minimum spark rate of one spark per second and sparking is consistent.

3. Cleaning/Painting

NOTE: Plug shall be cleaned just enough to remove carbon deposits.

The igniter plug may be cleaned with a stiff bristled brush or in an abrasive cabinet plug cleaner, then wiped off with solvent, Stoddard (Federal Specification P-D-680, Type I).



E-19A-12061

30. IGNITER PLUG
40. GASKET

Igniter Plug Removal/Installation
Figure 201

49-40-11
Page 202
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

IGNITION UNIT

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
Removal/Installation	201
Inspection/Check	201



MAINTENANCE MANUAL
GTCP30-92C(A)

IGNITION UNIT - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Ignition Unit (See Figure 201)

- (1) Disconnect ignition lead and harness electrical lead at ignition unit.
- (2) Remove screws (110), and washers (120), separate ignition unit (150) from bracket.

B. Install Ignition Unit (See Figure 201)

- (1) Position ignition unit (150) on bracket, and secure with washers (120) and screws (110).
- (2) Reconnect ignition lead and harness electrical lead to ignition unit (150).

2. Inspection/Check

A. Inspect Ignition Unit

- (1) Inspect threaded areas for stripped, crossed or peened threads.
- (2) Inspect input terminal lug and output connector for obvious damage.

B. Check Ignition Unit

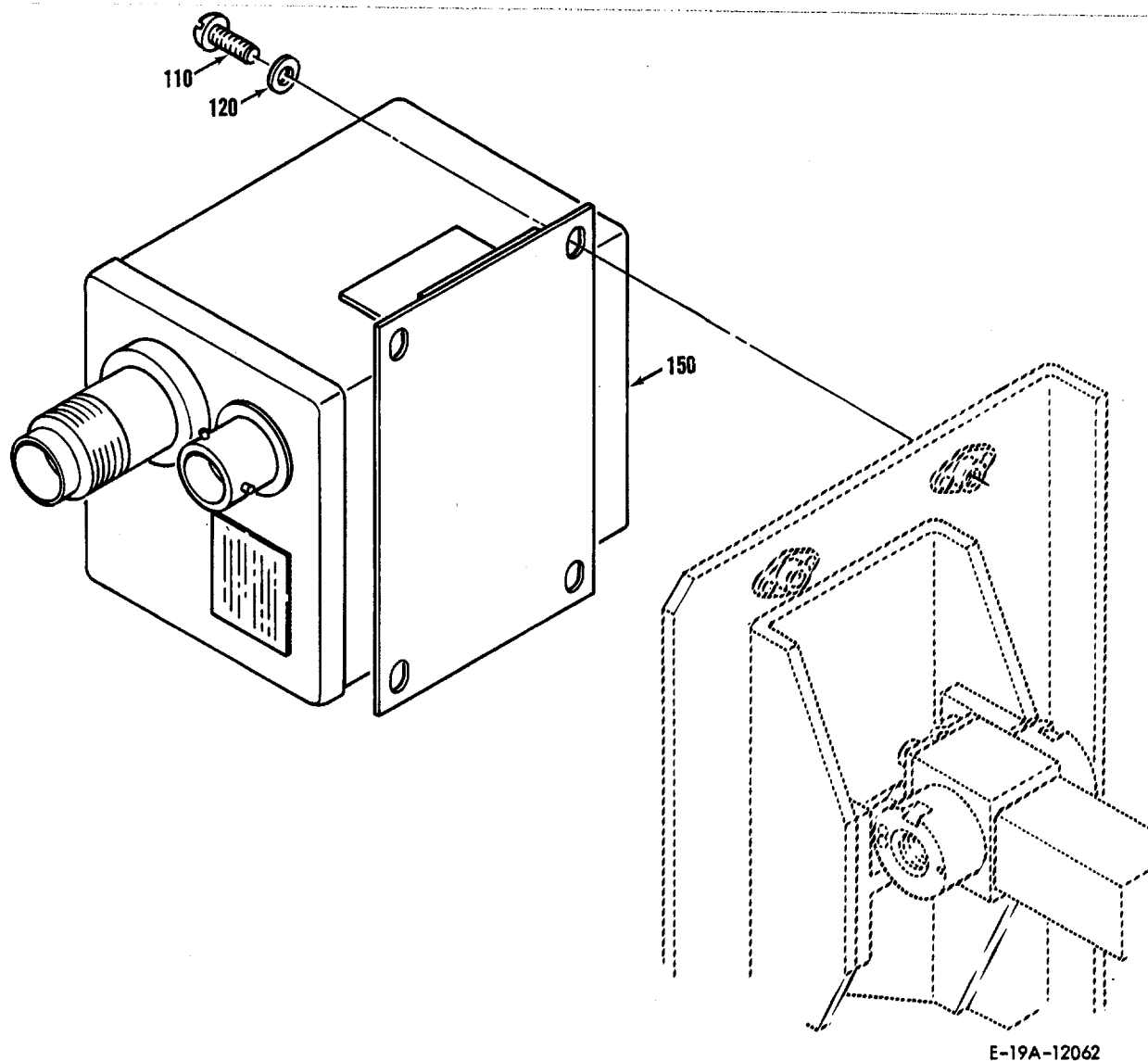
- (1) Connect a serviceable ignition lead and igniter plug to output connector.

CAUTION: AVOID HANDLING IGNITER PLUG DURING OPERATION AS
OUTPUT VOLTAGE MAY CAUSE INJURY OR DEATH.

- (2) Connect a source of electrical power (0 to 24 volts dc).
- (3) Adjust electrical power input to ignition unit between 14 and 28 vdc. Minimum allowable spark rate shall be four sparks per second.
- (4) Reduce input voltage to zero and remove electrical power source ignition lead and igniter plug.
- (5) Replace ignition unit not meeting Inspection/Check requirements.



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12062

- 110. SCREW
- 120. WASHER
- 150. IGNITION UNIT

Ignition Unit Removal/Installation
Figure 201

49-40-13
Page 202
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

AIR SECTION

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>CHAPTER/ SECTION/ SUBJECT</u>	<u>PAGE</u>
R DESCRIPTION AND OPERATION	49-50-00	
PNEUMATIC THERMOSTAT	49-50-04	

REFER TO APPLICABLE CHAPTER/SECTION/SUBJECT FOR EXPANDED CONTENTS



MAINTENANCE MANUAL
GTCP30-92C(A)

AIR SECTION - DESCRIPTION AND OPERATION

1. General

The engine air system is fully automatic in operation and acts to provide overtemperature protection to the engine.

2. Description

The air system consists of an overtemperature thermostat mounted in the engine tailpipe connected to the fuel control acceleration limiter valve by externally mounted tubing.

3. Operation

During acceleration or operation of the engine, if exhaust gas temperature exceeds a preset value, fuel flow is modified by action of the overtemperature thermostat on the acceleration limiter valve in the fuel control assembly. The thermostat opens to bleed off some of the reference compressor air pressure which allows the limiter valve to open and bypass fuel.



MAINTENANCE MANUAL
GTCP30-92C(A)

R

PNEUMATIC THERMOSTAT

TABLE OF CONTENTS

SUBJECT

PAGE

Removal/Installation

201



MAINTENANCE MANUAL
GTCP30-92C(A)

PNEUMATIC THERMOSTAT - MAINTENANCE PRACTICES

1. Removal/Installation

Table 201. Materials and Compounds

Material or Compound	Manufacturer
<u>NOTE:</u> Equivalent substitutes may be used for listed item.	
High temperature compound (Fel-Pro C5-A)	Fel-Pro Inc, Div of Felt Products Mfg Co, 7450 N McCormick Blvd, Skokie, IL 60076

A. Remove Pneumatic Thermostat (See Figure 201)

CAUTION: HOLD THERMOSTAT HEXAGON FITTING WHEN REMOVING TUBE ASSEMBLY.

- (1) Disconnect tube assembly.
- (2) Remove bolts (90, 140), washers (100, 150), plate (110), thermostat (120), cover (160) and gasket (170).

B. Install Pneumatic Thermostat (See Figure 201)

- (1) Apply a coat of high temperature compound (Fel-Pro C5-A) to threads of bolts (90, 140).

CAUTION: WHEN INSTALLING NEW OR REPLACEMENT THERMOSTATS, BE SURE THERMOSTAT IS CALIBRATED TO CORRECT CRACKING TEMPERATURE. DO NOT EXCEED 150 POUND-INCH TORQUE ON TUBING NUT WHEN ATTACHING TUBING.

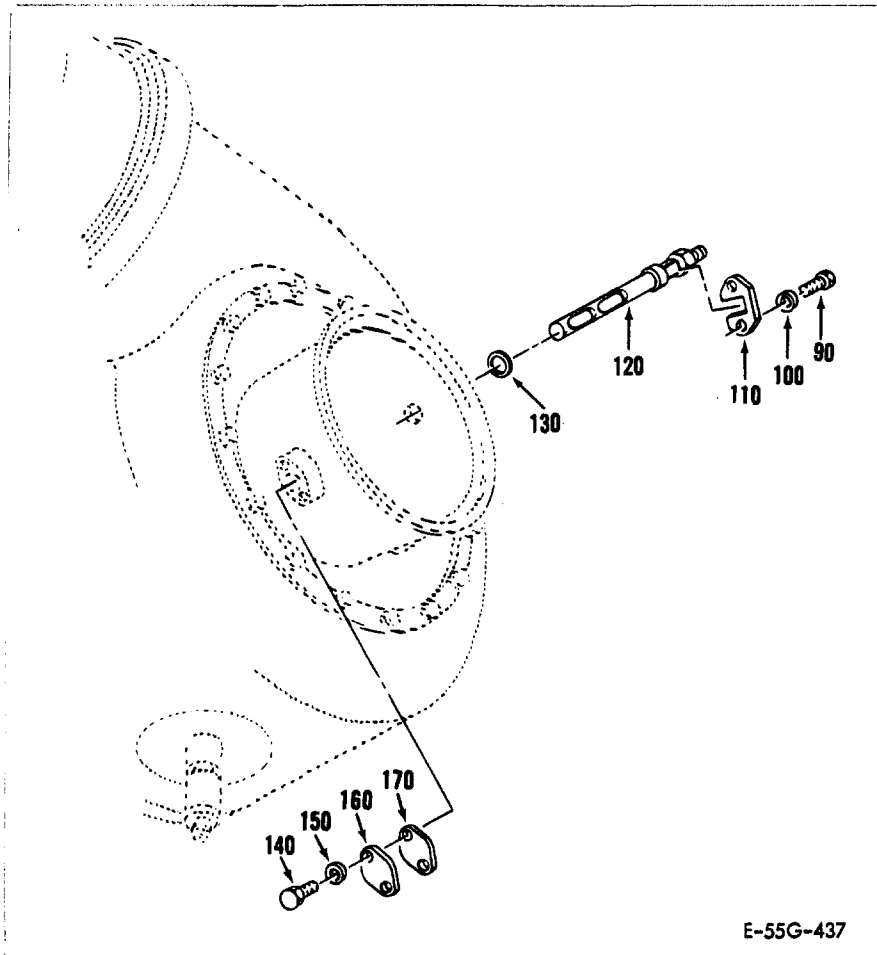
- (2) Install plate (110) with sharp edges toward thermostat (120). Install gasket (170) and cover (160). Secure thermostat (120) with plate (110) and cover (160), with gasket (170) in place with washers (100, 150) and bolts (90, 140).

CAUTION: HOLD THERMOSTAT HEXAGON FITTING WHEN INSTALLING TUBE ASSEMBLY.

- (3) Reconnect tube assembly to thermostat (120).



MAINTENANCE MANUAL
GTCP30-92C(A)



E-55G-437

- 90. BOLT
- 100. WASHER
- 110. PLATE
- 120. PNEUMATIC (ACCELERATION
CONTROL) THERMOSTAT

- 130. SHIM WASHER
- 140. BOLT
- 150. WASHER
- 160. COVER
- 170. GASKET

Pneumatic Thermostat Removal/Installation
Figure 201

NOTE: Page 203/204 deleted.

49-50-04
Page 202
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

ENGINE CONTROLS SECTION

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>CHAPTER/ SECTION/ SUBJECT</u>	<u>PAGE</u>
R DESCRIPTION AND OPERATION	49-60-00	
OVERSPEED SWITCH	49-60-31	

REFER TO APPLICABLE CHAPTER/SECTION/SUBJECT FOR EXPANDED CONTENTS



MAINTENANCE MANUAL
GTCP30-92C(A)

ENGINE CONTROLS SECTION - DESCRIPTION AND OPERATION

1. General

The engine controls system is fully automatic in operation; however, customer-furnished holding relays and switches are required for operation.

2. Description

The overspeed switch is a flyweight actuated switch, mounted on the front of the gearcase housing assembly and splined into the gearcase housing assembly gear train.

3. Operation

If engine speed approaches 110 percent of governed speed, and governing devices in the fuel control assembly have not metered fuel flow sufficiently to reduce speed, the overspeed switch assembly is actuated by flyweight action. Actuation of the switch opens the fuel solenoid valve holding circuit and de-energizes and closes the fuel solenoid valve. This shuts off fuel flow to the fuel atomizer and stops the engine.



MAINTENANCE MANUAL
GTCP30-92C(A)

OVERSPEED SWITCH

TABLE OF CONTENTS

SUBJECT

PAGE

Removal/Installation

201

Inspection/Check

202A/202B



MAINTENANCE MANUAL
GTCP30-92C(A)

OVERSPEED SWITCH - MAINTENANCE PRACTICES

1. Removal/Installation

R Table 201. Materials and Compounds

R Material or Compound	Manufacturer
------------------------	--------------

R NOTE: Equivalent substitutes may be used for listed item.

R Jointing compound R (Hylomar PL32H) R	Van Dusen Air Incorporated, Aircraft Supplies Division, 311 South 32nd St, Phoenix, AZ 85034
---	--

CAUTION: EXERCISE CARE DURING REMOVAL OF OVERSPEED SWITCH TO AVOID
DAMAGE TO GOVERNOR ASSEMBLY.

A. Remove Overspeed Switch Assembly (See Figure 201)

- (1) Remove harness assembly from overspeed switch assembly.
- (2) Remove screws (10), and washers (20), separate overspeed switch (30) from gearcase housing assembly. Remove gasket (40).
- (3) Bend tab of key washer (60) to free governor assembly (50) then install Spanner Wrench Part No. 253562-2 into slots of output shaft, and install Adapter Wrench Part No. 281409-1 on flats of governor assembly (50). Remove governor assembly, key washer, and washer (70).

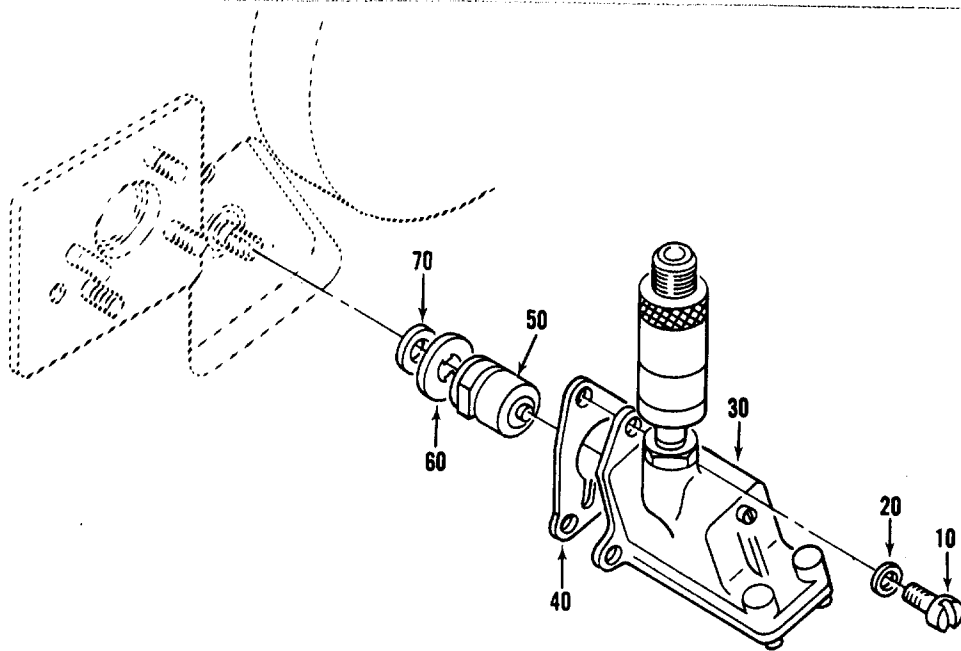
B. Install Overspeed Switch Assembly

NOTE: New or overhauled replacement governor assembly (50) is bench calibrated for correct adjustment.

- (1) Install new washer (70) and key washer (60) on gearshaft, use Spanner Wrench Part No. 253562-2 to lock gear train, and Adapter Wrench Part No. 281409-1 and a torque wrench to install governor assembly (50). Tighten governor assembly to a torque value of 225 to 275 inch-pounds. Bend tab of key washer into slot in governor assembly.
- R (2) Coat both sides of gasket (40) with jointing compound (Hylomer
R PL32H). Install gasket (40) and overspeed switch (30), secure with washers (20) and screws (10). Lockwire screws (10).
- (3) Reinstall harness assembly on overspeed switch (30).



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12250

- 10. SCREW
- 20. WASHER
- 30. OVERSPEED SWITCH

- 40. GASKET
- 50. GOVERNOR ASSY
- 60. KEY WASHER
- 70. WASHER

Overspeed Switch Removal/Installation
Figure 201

49-60-31
Page 202
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

2. Inspection/Check

A. Inspect Overspeed Switch Assembly

- (1) Inspect electrical connector for cross, stripped, or peened threads and bent or broken connector pins.
- (2) Inspect overspeed switch (30) for general security of components and freedom from damage.

B. Check Overspeed Switch Assembly

NOTE: Perform following checks with governor and overspeed switch installed on engine.

- (1) Using standard continuity tester, check for continuity across Pins A and B of electrical connector of solenoid on top of overspeed switch. There shall be continuity.
- (2) Connect a means for measuring continuity across pins of switch receptacle to set switch actuation. Turn adjusting screw in center of switch assembly counterclockwise until circuit just opens (if circuit is already open, turn screw clockwise to close, then turn counterclockwise until circuit just opens). Then turn screw clockwise one and one-half to one and three-quarter turns clockwise and lockwire in position.
- (3) Connect standard continuity tester to Pins A and B of connector on bottom of overspeed switch assembly. Apply system voltage to energize solenoid on top of overspeed switch. Check for continuity at Pins A and B of connector on bottom of overspeed switch assembly. There shall be no continuity.
- (4) If there is no continuity when solenoid is de-energized, loosen nut attaching solenoid to overspeed switch assembly. Turn solenoid counterclockwise until continuity is indicated.



MAINTENANCE MANUAL
GTCP30-92C(A)

CAUTION: OBSERVE RPM ABSOLUTE MAXIMUM OF 64,900 RPM (110 PERCENT). ENSURE THAT FUEL CONTROL GOVERNOR IS RESET TO PROPER RPM.

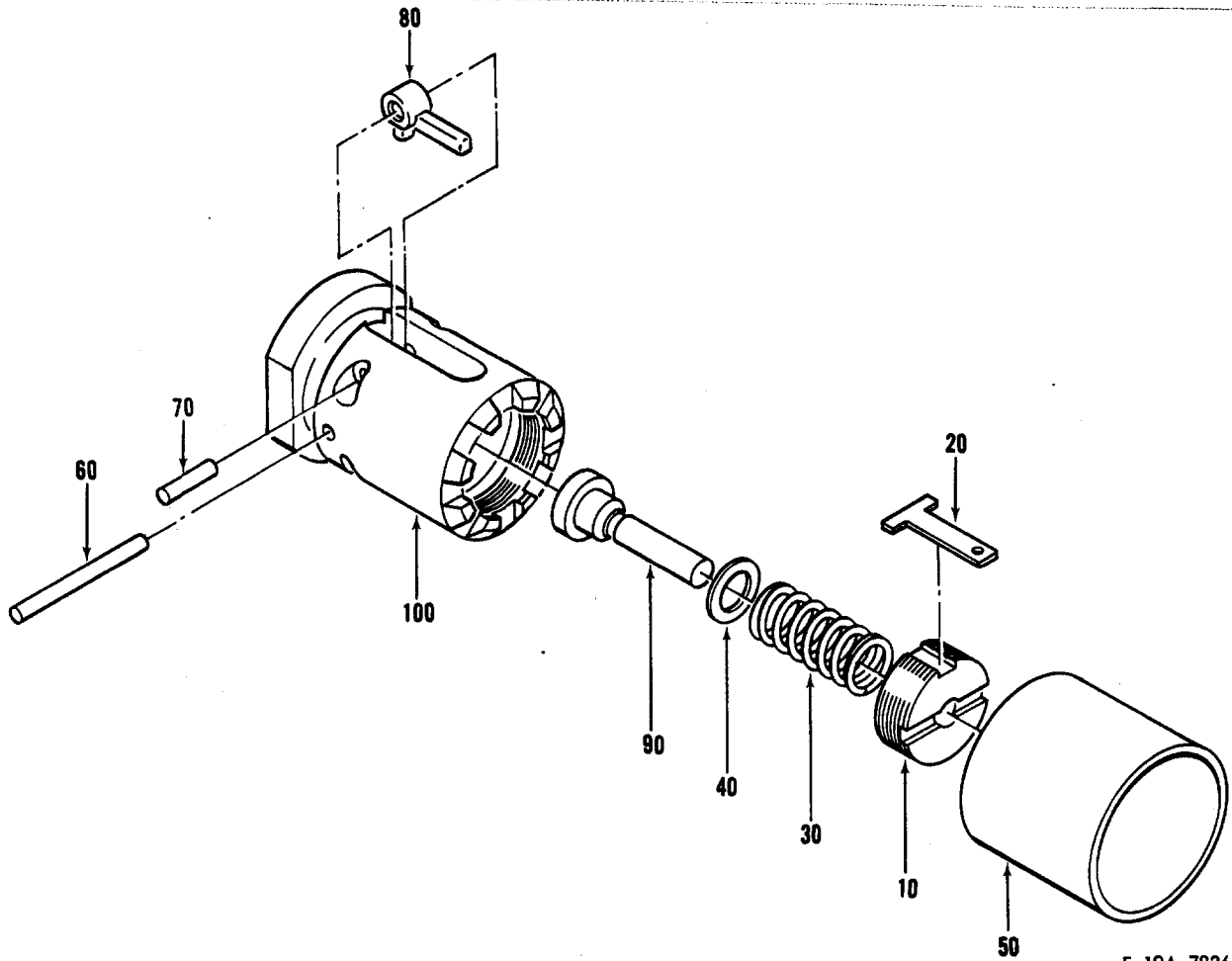
2. B. (5) After overspeed switch is checked and adjusted (if required) as described in steps (1) through (4), operate engine in accordance with Section 49-20-00, ADJUSTMENT/TEST, carefully increase fuel control governor setting as described in Section 49-20-00, ADJUSTMENT/TEST. Record overspeed switch actuator rpm.
- (6) If overspeed switch actuation point is not as specified, remove overspeed switch (30) as described in Removal/Installation, 1.A.(1) and remove governor assembly (50) as described in 1.A.(3).

CAUTION: LOCKING KEY (20) MUST SECURE ADJUSTING PLATE OR OVERSPEED SWITCH ACTUATION POINT MAY CHANGE. USE CARE TO PREVENT BREAKING LOCKING KEY (20).

- (7) Calibrate governor assembly as follows. (See figure 202.)
 - (a) Bend locking key (20) from slot in housing on front face of governor. Remove adjusting screw (10).
 - (b) Remove washers (40) and spring (30). Reinstall spring (30) and adjusting screw (10). Turn adjusting screw until approximately flush with top face of governor body.



MAINTENANCE MANUAL
GTCP30-92C(A)



- 10. ADJUSTING SCREW
- 20. LOCKING KEY
- 30. SPRING
- 40. WASHER
- 50. SLEEVE

- 60. PIN
- 70. PIN
- 80. FLYWEIGHT
- 90. GOVERNOR SHAFT
- 100. GOVERNOR BODY

Governor Assembly Removal/Installation
Figure 202

49-60-31
Page 204
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

2. B. (7) (c) Install locking key (20) and bend tab-lock enough to catch governor body slot. Further bending will make adjustment of screw difficult during testing.
- (d) Install governor into Governor Calibrator Part No. 281491-1. Connect and adjust air supply to calibrator drive motor at 55 $\pm$ 5 psig pressure.
- (e) Move calibrator head toward governor to actuate calibrator dummy switch then back calibrator head away so that calibrator dummy switch deactuates. Turn calibrator head adjustment screw one and one-half to one and three-quarter turns. Calibrator actuating lever should not be touching governor shaft (90). Calibrator actuating lever should not be restricted in any way when pivoting to actuate calibrator dummy switch.

NOTE: The governor shaft (90) has approximately 0.065 inch of throwout. The governor travel required to actuate the calibrator dummy switch and display the speed must be less than 0.065 inch.

- (f) Accelerate the governor calibrator drive from standstill and observe the speed reading at which governor shaft (90) extends, actuating the dummy switch. Acceleration through actuation point should not exceed a rate of change of 100 rpm per second. Maximum speed for governor is 32,500 rpm.
- (g) If governor throwout speed is not within limits specified in Table 202, remove governor assembly from calibrator and adjust screw. Turning screw clockwise one locking-slot will increase throwout speed approximately 550 rpm. For the same locked screw position, the addition of 0.005 inch washers (40) under spring will increase throwout speed approximately 650 rpm.
- (h) Repeat steps (f) and (g) until actuation speed specified in Table 202 is achieved. Adjusting screw (10) should be flush or below the top face of governor after correct adjustment is obtained. Secure locking key (20).
- (i) Check governor repeatability by accelerating governor to actuation and allowing governor to coast down five times. Record speed points.
- (j) If actuation speed does not repeat within range specified in Table 202, repeat steps (e) and (i).
- (k) Install governor assembly as described in step 1.B.(1).



MAINTENANCE MANUAL
GTCP30-92C(A)

NOTE: Adjustment of overspeed switch is not normally required unless the governor is replaced.

2. B. (8) Perform procedures described in preceding step (5). If overspeed actuation point is not as specified, repeat steps (6) through (8) until requirement is satisfied.

Table 201. Special Tools, Fixtures and Equipment

Nomenclature	Use	Source/ Part No.
<u>NOTE:</u> Equivalent substitutes may be used for listed items.		
Spanner Wrench	For tightening or loosening output shaft nut.	253562-2
Adapter Wrench	Used to remove governor assembly.	281409-1
Governor Calibrator	Provides variable speed rotating drive and instrumentation. Air controls for functional testing and calibration.	281491-1

Table 202. Calibration Speeds

Actuation Speed (rpm)	
Part No. 379975-2	29,250 +350/-350



MAINTENANCE MANUAL
GTCP30-92C(A)

INDICATING SECTION

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>CHAPTER/ SECTION/ SUBJECT</u>	<u>PAGE</u>
R DESCRIPTION AND OPERATION	49-70-00	
HOURMETER	49-70-20	
EXHAUST GAS TEMPERATURE THERMOCOUPLE	49-70-22	
TACHOMETER - GENERATOR	49-70-39	

REFER TO APPLICABLE CHAPTER/SECTION/SUBJECT FOR EXPANDED CONTENTS



MAINTENANCE MANUAL
GTCP30-92C(A)

INDICATING SECTION - DESCRIPTION AND OPERATION

1. General

The engine indicating section components provide signals to aircraft meters for read-out, except the hourmeter, which is read directly. An engine speed indication signal is provided by a tachometer-generator. Turbine discharge temperature indication is provided by an exhaust gas temperature thermocouple.

2. Description

The indicating components consist of a hourmeter mounted in a bracket on the lower right side of the accessory drive gearcase assembly, a tachometer-generator mounted on the rear right side of the accessory drive gearcase assembly, and an exhaust gas temperature thermocouple mounted in the tailpipe.

3. Operation

The hourmeter records hours and tenths of operating time. The tachometer-generator provides a signal to the tachometer indicator to reflect percentage of engine speed. The exhaust gas temperature thermocouple utilizes exhaust gases to generate a millivoltage. This millivoltage is converted to mechanical energy and is reflected on the exhaust gas temperature indicator.



MAINTENANCE MANUAL
GTCP30-92C(A)

HOURLMETER

TABLE OF CONTENTS

SUBJECT

PAGE

Removal/Installation

201



MAINTENANCE MANUAL
GTCP30-92C(A)

HOURMETER - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Hourmeter (See Figure 201)

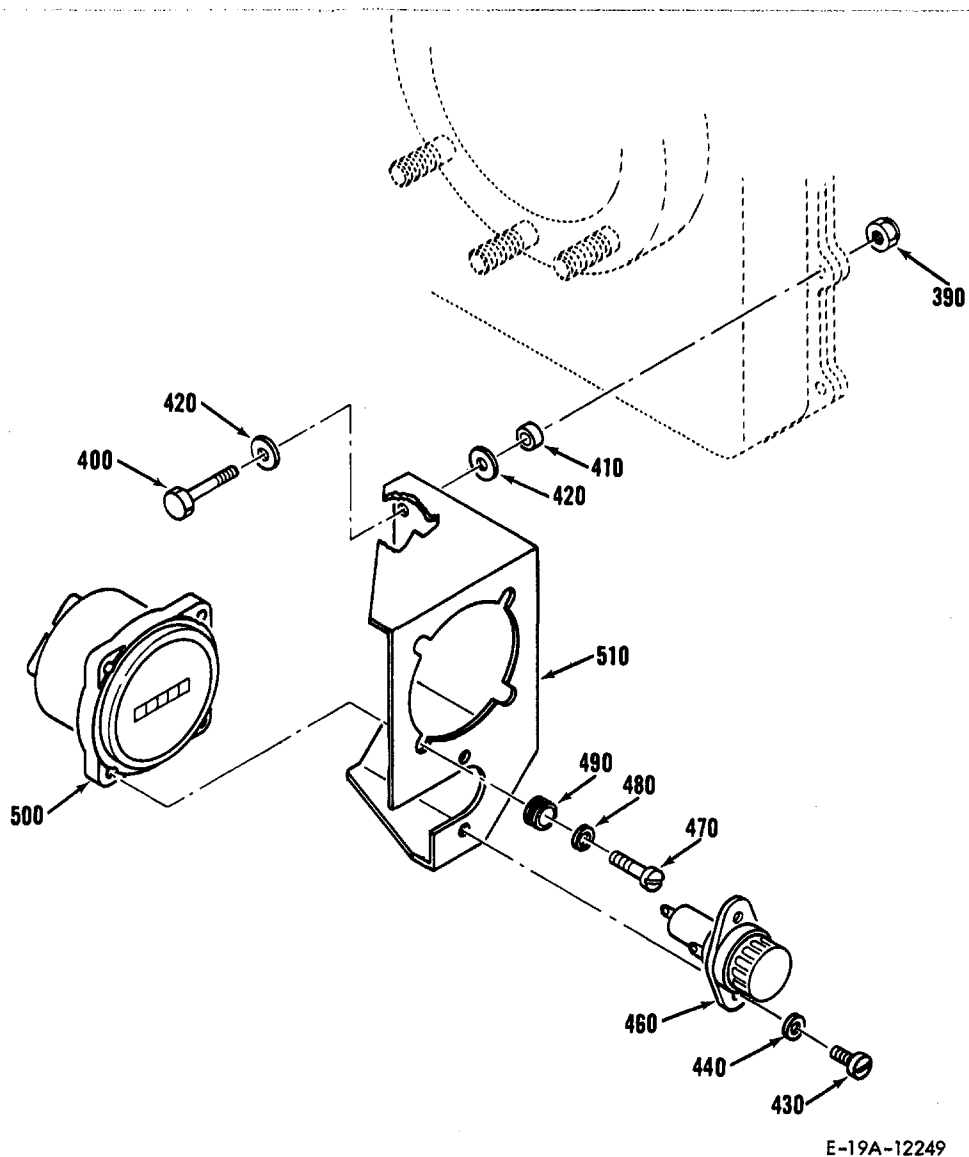
- (1) Remove nuts (390), washers (420), spacers (410), and bolts (400), lift hourmeter (500), with bracket (510), and fuse holder (460) from engine.
- (2) Remove screws (430) and washers (440), separate fuse holder (460) from assembled parts, then remove screws from back of hourmeter and separate electrical leads from back of hourmeter.
- (3) Remove screw (470), washer (480), and grommet (490), securing hourmeter (500) to bracket (510) and separate parts.

B. Install Hourmeter (See Figure 201)

- (1) Position hourmeter (500) on bracket (510) and secure with grommet (490), washers (480), and screws (470).
- (2) Position fuse holder (460) on bracket (510) and secure with screws (430) and washers (440).
- (3) Attach electrical leads to hourmeter with screws.
- (4) Position assembled parts on engine and secure using bolts (400), washers (420), spacers (410) and nuts (390).



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12249

- 390. NUT
- 400. BOLT
- 410. SPACER
- 420. WASHER
- 430. SCREW
- 440. WASHER

- 460. FUSE HOLDER
- 470. SCREW
- 480. WASHER
- 490. GROMMET
- 500. HOURMETER
- 510. BRACKET

Hourmeter Removal/Installation
Figure 201

49-70-20
Page 202
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

EXHAUST GAS TEMPERATURE THERMOCOUPLE

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
Removal/Installation	201
Inspection/Check	201



MAINTENANCE MANUAL
GTCP30-92C(A)

EXHAUST GAS TEMPERATURE THERMOCOUPLE - MAINTENANCE PRACTICES

1. Removal/Installation

Table 201. Materials and Compounds

Material or Compound	Manufacturer
<u>NOTE:</u> Equivalent substitutes may be used for listed item.	
High temperature compound (Fel-Pro C5-A)	Fel-Pro Inc, Div of Felt Products Mfg Co, 7450 N McCormick Blvd, Skokie, IL 60076

A. Remove Exhaust Gas Temperature Thermocouple (70) (See Figure 201)

CAUTION: EXERCISE CARE WHEN DISCONNECTING ELECTRICAL LEADS
TO PREVENT DAMAGE TO THERMOCOUPLE.

- (1) Remove nuts (30, 40) and disconnect electrical leads from terminals of exhaust gas temperature thermocouple (70).
- (2) Remove attaching bolts (50) and washers (60), then carefully withdraw exhaust gas temperature thermocouple (70) from exhaust flange of turbine plenum assembly

B. Install Exhaust Gas Temperature Thermocouple (70) (See Figure 201)

- (1) Install exhaust gas temperature thermocouple (70) in exhaust flange of turbine plenum assembly. Coat threads of attaching bolts (50) with high temperature compound (Fel-Pro C5-A). Secure exhaust gas temperature thermocouple with washers (60) and bolts (50).

CAUTION: DO NOT EXCEED 25 INCH-POUNDS TIGHTENING TORQUE AT
AL TERMINAL AND 15 INCH-POUNDS TIGHTENING TORQUE
AT CR TERMINAL WHEN RECONNECTING ELECTRICAL LEADS.

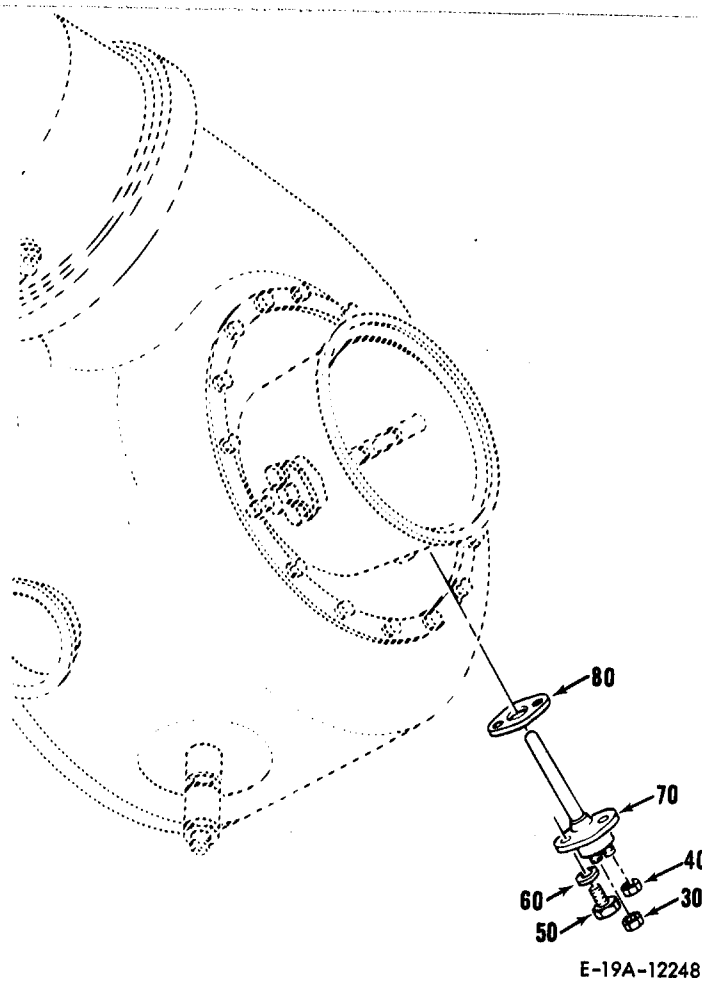
- (2) Reconnect electrical leads and install nuts (30, 40) to exhaust gas temperature thermocouple (70) terminals, matching chromel lead to CR and alumel lead to AL marked terminals.

2. Inspection/Check

Exhaust gas temperature thermocouple (70) shall be checked if special facilities are available. At surrounding temperature of 677C (1250F), exhaust gas temperature thermocouple shall register 28.00 to 28.30 millivolts.



MAINTENANCE MANUAL
GTCP30-92C(A)



- 30. NUT
- 40. NUT
- 50. BOLT
- 60. WASHER

- 70. EXHAUST GAS TEMPERATURE
THERMOCOUPLE
- 80. GASKET

Exhaust Gas Temperature Thermocouple
Removal/Installation
Figure 201



MAINTENANCE MANUAL
GTCP30-92C(A)

TACHOMETER - GENERATOR

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
Removal/Installation	201
Adjustment/Test	201



MAINTENANCE MANUAL
GTCP30-92C(A)

TACHOMETER-GENERATOR - MAINTENANCE PRACTICES

1. Removal/Installation

CAUTION: REMOVE TACHOMETER-GENERATOR IN A STRAIGHT LINE FROM MOUNTING PAD TO AVOID DAMAGE TO SHAFT.

A. Remove Tachometer-Generator (See Figure 201)

- (1) Disconnect customer-furnished connector at tachometer-generator (210).

CAUTION: REMOVE TACHOMETER-GENERATOR IN A STRAIGHT LINE FROM MOUNTING PAD TO AVOID DAMAGE TO SHAFT.

- (2) Remove bolt (180), washer (190), fork clamp (200), and tachometer-generator (210) with packing (220) from engine.
- (3) Remove and discard packing (220).

B. Install Tachometer-Generator (See Figure 201)

- (1) Assemble new packing (220) on flange of tachometer-generator (210).
- (2) Install tachometer-generator (210) with packing (220) on engine and secure with fork clamp (200), washer (190), and bolt (180).
- (3) Connect customer-furnished connector to receptacle on tachometer-generator (210).

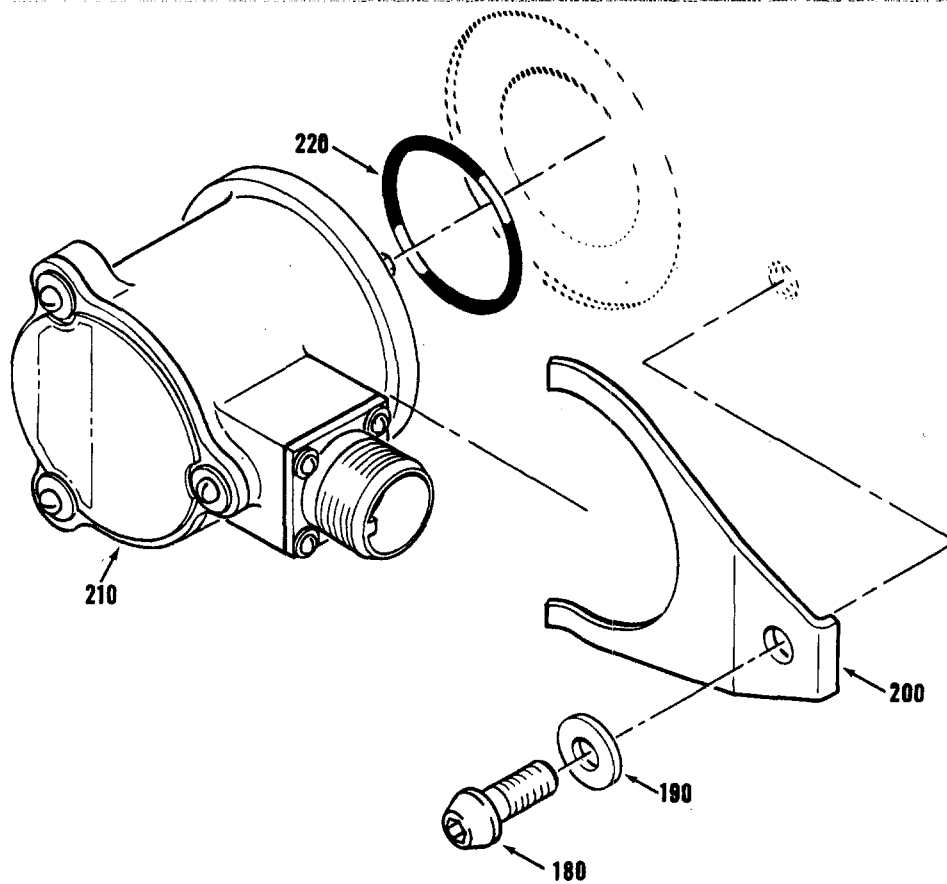
2. Adjustment/Test

A. Check Operation of Tachometer-Generator

Check engine start, acceleration, operation and automatic controls actuation. (Refer to Section 49-20-00, ADJUSTMENT/TEST.)



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12247

- 180. BOLT
- 190. WASHER
- 200. CLAMP

- 210. TACHOMETER-GENERATOR
- 220. PACKING

Tachometer-Generator Removal/Installation
Figure 201

49-70-39
Page 202
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

OIL SECTION

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>CHAPTER/ SECTION/ SUBJECT</u>	<u>PAGE</u>
R DESCRIPTION AND OPERATION	49-90-00	
OIL FILTER PRESSURE RELIEF VALVE	49-90-15	
OIL FILTER ELEMENT	49-90-18	
OIL PRESSURE REGULATOR ASSEMBLY	49-90-20	

REFER TO APPLICABLE CHAPTER/SECTION/SUBJECT FOR EXPANDED CONTENTS



MAINTENANCE MANUAL
GTCP30-92C(A)

OIL SECTION - DESCRIPTION AND OPERATION

1. General

The engine lubrication (oil) system except the oil filter assembly is completely contained within the gear drive housing, and provides for storage, filtration, delivery, and scavenge of oil at the bearings and gears at the required pressure and amount. The oil filter assembly is remotely located.

2. Description

The lubrication system consists of an oil sump housed within the gear drive housing, oil pump or remotely located oil filter assembly, oil filter pressure relief valve, oil pressure regulator assembly, and oil jets. (See figure 1, 49-20-00.)

3. Operation

Lubricant stored in the oil sump is routed to the oil pump, then to the oil filter, if the oil filter is clogged the oil filter pressure relief valve opens to bypass oil to ensure continued lubrication to bearings and gears. In the event oil pressure rises above a preset value the oil filter pressure regulator assembly bypasses oil to the oil sump, maintaining the desired oil pressure, oil then flows to the oil jets delivering oil to the bearing and gears.



MAINTENANCE MANUAL
GTCP30-92C(A)

OIL FILTER PRESSURE RELIEF VALVE

TABLE OF CONTENTS

SUBJECT

PAGE

Removal/Installation

201



MAINTENANCE MANUAL
GTCP30-92C(A)

OIL FILTER PRESSURE RELIEF VALVE - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Oil Filter Pressure Relief Valve (See Figure 201)

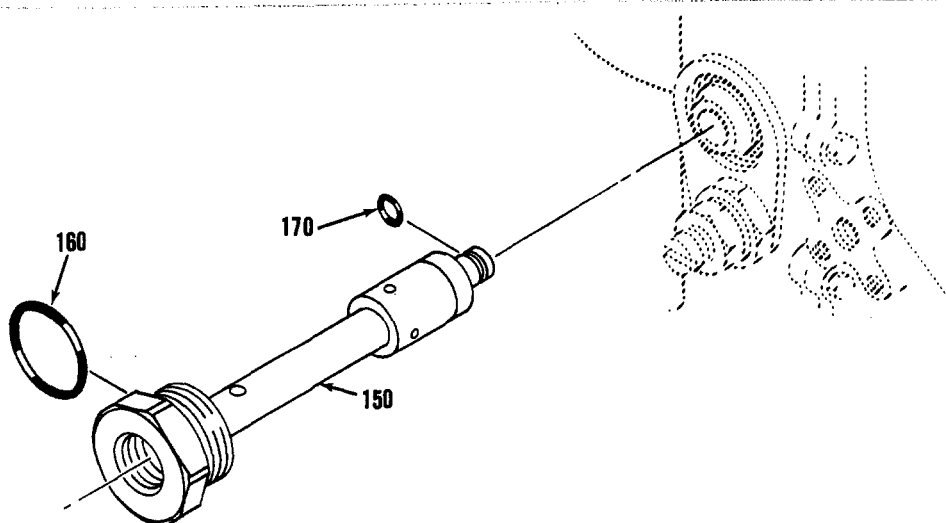
- (1) Remove oil filter pressure relief valve (150) with packings (160, 170) from gear drive housing.
- (2) Remove and discard packings (160, 170).

B. Install Oil Filter Pressure Relief Valve

- (1) Install new packings (160, 170) on oil filter pressure relief valve (150).
- (2) Install oil filter pressure relief valve (150) with packings (160, 170) into gear drive housing.



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12063

160. PACKING
150. PRESSURE RELIEF VALVE

170. PACKING

Oil Filter Pressure Relief Valve
Removal/Installation
Figure 201

49-90-15
Page 202
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

OIL FILTER ELEMENT

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
Removal/Installation	201
Inspection/Check	201



MAINTENANCE MANUAL
GTCP30-92C(A)

OIL FILTER ELEMENT - MAINTNENACE PRACTICES

1. Removal/Installation (See Figure 201)

A. Remove Oil Filter Element

- (1) Remove oil filter housing (10) with packing (20) from cover (50).
- (2) Remove oil filter element (30) and packing (20) from cover (50).
Discard oil filter element and packing.

B. Install Oil Filter Element

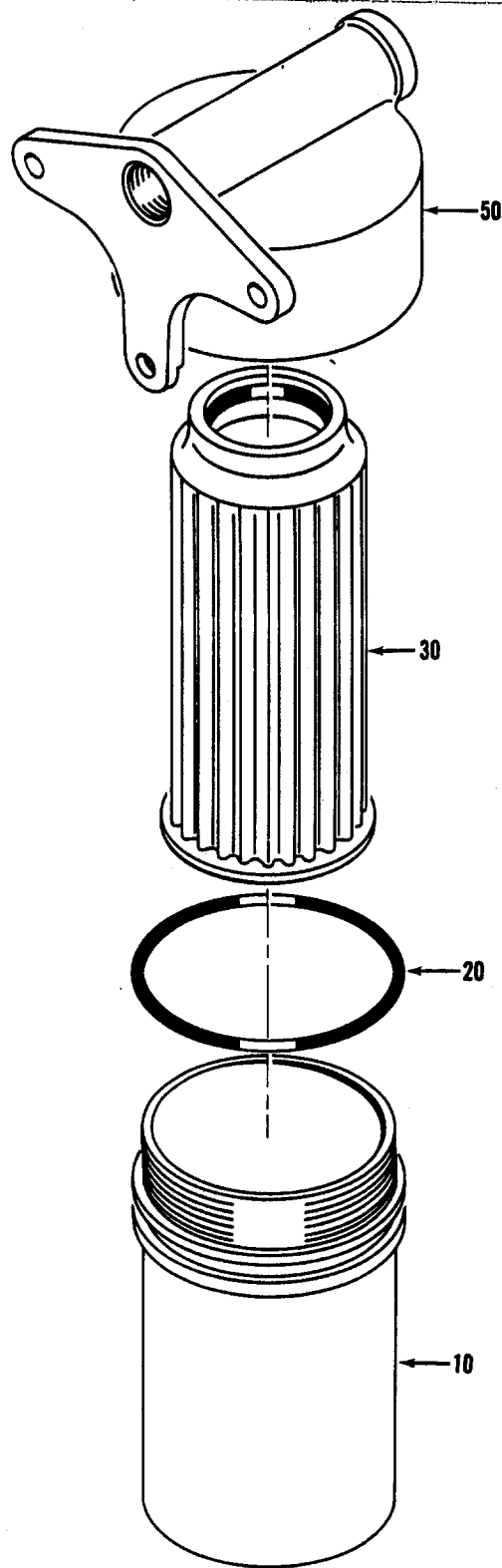
- (1) Install new oil filter element (30) into oil filter housing (10).
- (2) Install oil filter housing (10) with new packing (20) into cover (50).

2. Inspection/Check

Visually check filter element for metal particles and other foreign material which may indicate internal engine damage. If metal particles are indicated, change oil and oil filter element, then operate the APU for minimum of fifteen (15) minutes. If no further accumulation after 15 minutes, APU is acceptable for continued service. Further accumulation during the 15 minute run is unacceptable.



MAINTENANCE MANUAL
GTCP30-92C(A)



- 10. HOUSING
- 20. PACKING
- 30. FILTER ELEMENT
- 50. COVER

E-19A-12246

Oil Filter Element Removal/Installation
Figure 202

49-90-18
Page 202
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

OIL PRESSURE REGULATOR ASSEMBLY

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
Removal/Installation	201
Adjustment/Test	201



MAINTENANCE MANUAL
GTCP30-92C(A)

OIL PRESSURE REGULATOR ASSEMBLY - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Oil Pressure Regulator Assembly (See Figure 201)

- (1) Remove oil pressure regulator assembly (130) with packing (140) from engine.
- (2) Remove and discard packing (140).

B. Install Oil Pressure Regulator Assembly (See Figure 201)

- ✓ (1) Assemble new packing (140) on oil pressure regulator assembly (130).
- (2) Install oil pressure regulator assembly (130) with packing (140) into engine.

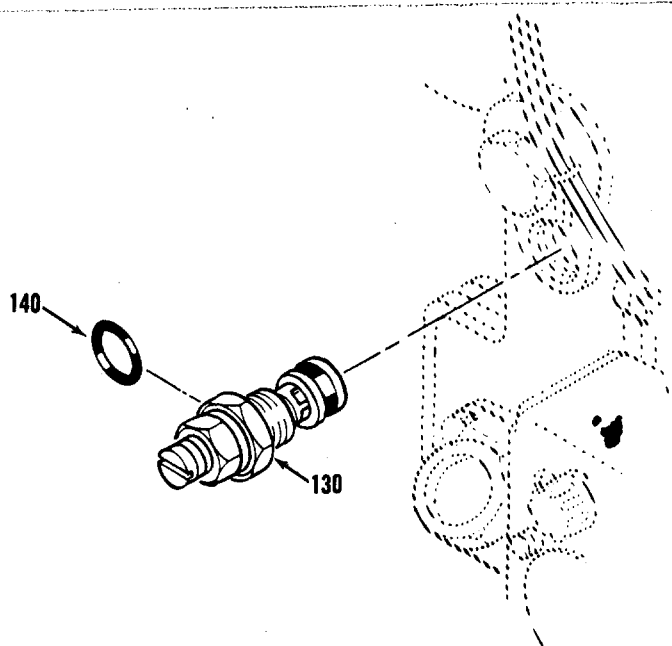
2. Adjustment/Test

A. Check Operation of Oil Pressure Regulator Assembly

Check oil pressure regulator assembly setting and calibrate if required.
(Refer to Section 49-20-00, ADJUSTMENT/TEST.)



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12245

130. OIL PRESSURE REGULATOR ASSY

140. PACKING

Oil Pressure Regulator Assembly
Removal/Installation
Figure 201

49-90-20
Page 202
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

ILLUSTRATED REPLACEMENT PARTS LIST

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
General	1101
Vendor Code List	1102
Numerical Index	1105
Replacement Parts List	1116

ILLUSTRATED PARTS LIST
49-23-23-CONTENTS
May 28/82



MAINTENANCE MANUAL
GTCP30-92C(A)

LIST OF REPLACEMENT PARTS

1. General

This section lists and describes parts necessary for maintenance support of engines manufactured by Garrett Turbine Engine Company, A Division of the Garrett Corporation, P.O. Box 29003, Phoenix, Arizona 85038. Engines covered in this publication are listed in Table 1. Equipment Identification List.

2. Engine Identification System

The manufacturer's engine identification system provides for a model number, part number, series number and change number (if applicable) which are stamped on the identification plate.

NOTE: When change numbers appear on the identification plate, these change numbers are used with the engine part number and series number to determine the engine configuration.

3. Garrett Part Numbering System

Part numbers are assigned to each item manufactured by Garrett. The part numbering consists of a straight numerical system of four, five, six or seven digits. The numbers may be prefixed with letters and suffixed with dash numbers or letters.

Prefix letters used with a part number usually indicate a type of part or method of procurement. Suffix numbers used with a part number usually indicate configuration differences or, when applied to standard part numbers, indicate design differences. Suffix letters usually indicate material, color, or finish difference.

The letter "S" prefixed to a part number designates an Garrett standard part number.

The commercial standard part numbers consist of ten digit numbers separated into two groups of three digits each and one group of four digits. A commercial standard number is the Garrett number used to identify off-the-shelf items.

4. How to Use This Replacement Parts List

Coding of individual items listed in the Illustrated Parts List (IPL) has been deleted. Items listed in the IPL that have been replaced or installed are referenced to the service bulletin that incorporated the items in the manual. These references are indicated in the nomenclature column of the IPL and also in the text throughout the manual.

The word REPLACES (or the notation REPL) means this part is newer and therefore, probably more desirable than the REPLACED BY (REPL BY) part; however, either part may be used.



MAINTENANCE MANUAL
GTCP30-92C(A)

The word ALTERNATE (ALT) means either part may be used and that neither part is more desirable than the other.

When a part is identified and also referenced (RF), the quantity for that part is either listed elsewhere in the catalog or in a referenced catalog listed in the nomenclature column. If the listed catalog is a vendor's catalog, the vendor's code is also listed.

In some instances there are gaps in item number sequence, and the item numbers are not continuously sequential.

Earlier series parts are listed first with the latest series parts listed directly below.

5. Vendor Code

Vendor codes, preceded by the capital letter "V", are used in the nomenclature column of the Detailed Parts List. A listing of these codes in numerical sequence, with vendor's name and address, is contained in Table 1101. When no code number exists, the vendor's full name and address is included in the nomenclature column of the Detailed Parts List.

Table 1101. Vendors Code List

Code	Vendor
V85639	Klincher Locknut Corp, 2153 Hillside Ave, P.O. Box 18100, Indianapolis, IN 46218



MAINTENANCE MANUAL
GTCP30-92C(A)

6. Numerical Index



MAINTENANCE MANUAL
GTCP30-92C(A)

PART NO.	AIRLINE STOCK NO.	CH-SECT-UNIT FIG. ITEM	TTL REQ
AN3CH12A		16 100	16
AN3CH3A		9 50	2
		90	2
		140	2
AN3CH4A		2 180A	2
AN3CH5A		16 40	16
AN3C11A		3 210	1
		17 110	1
AN3C12A		3 400	RF
		12 400	RF
		17 210	2
AN3C21A		3 170	3
		17 20	3
AN3C23A		3 20	1
		17 150	1
AN3C3A		3 320	1
AN3C4A		3 280	2
AN4CH5A		4 50	3
AN500AD10-8		10 10	3
AN500D10-8		1 160	1
AN501D10		8 110	RF
AN515-6R10		3 430	2
		12 430	RF
AN515-6R14		3 470	4
		12 470	RF
AN775-8J		2 100	1
AN776-8J		2 120	1
AN814-4SL		4 110	1
AN814-6D		17 80	1
AN815-4J		1 40	2
AN815-6J		2 60	1
AN834-8J		2 230	1
AN837-8J		2 280	1
AN919-1J		2 130	1
AN919-10J		2 80	1
AN924-4J		1 200	1
		2 40	1
AN924-8J		2 240	1
AN929-8J		2 260	1
AN960-416L		4 60	3
AN960C10L		1 170	1
		2 190	2
		3 40	1
		80	2
		120	3

NUMERICAL INDEX
49-23-23
ALPHA - PAGE 1105
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

PART NO.	AIRLINE STOCK NO.	CH-SECT-UNIT FIG. ITEM	TTL REQ
		140	1
		190	3
		230	1
		290	2
		330	1
		360	2
		420	RF
	5	20	4
	6	80	RF
	8	120	RF
	9	60	2
		100	2
		150	2
	10	20	3
	12	420	RF
	16	20	36
		50	16
		110	32
	17	30	3
		130	1
		160	2
		230	2
AN960C416L	13	190	1
AN960C6L	3	480	4
	12	480	RF
F5C1032-1	9	30	1
F5C832-1	9	40	1
MS20074-03-03	2	160	2
		180	2
MS20074-03-06	3	350	2
	16	10	18
MS20074-04-05	13	180	1
MS21044N04	1	270	4
MS21044N3	3	10	1
		70	2
		160	3
		200	1
		390	RF
	6	70	RF
	12	390	RF
	17	10	3
		100	1
		140	1
		200	2
MS21083N3	3	270	2

NUMERICAL INDEX
49-23-23
ALPHA - PAGE 1106
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

PART NO.	AIRLINE STOCK NO.	CH-SECT-UNIT FIG. ITEM	TTL REQ
		310	1
MS29513-12		7 100	1
MS29513-120		7 80	1
MS35206-217		1 290	4
MS35266-62		3 110	3
MS35266-64		3 90	2
		130	1
		6 90	RF
		8 110A	RF
MS35275-263		10 10A	3
MS8000G210A		2 20	1
MS9489-30		3 170A	3
		17 20A	3
NAS1023C06W		17 250	2
NAS129C3M		7 20	3
NAS43DD3-11		3 50	1
		220	1
		17 120	1
		170	1
NAS43DD3-8		3 370	2
NAS43DD3-80		3 60	1
		180	3
		17 40	3
		180	1
NAS609C3-10		5 10	4
NAS620C10L		7 30	3
NAS620C4L		1 280	8
S8079-286		1 200A	1
S8128C10-49-5A		3 410	RF
		12 410	RF
		17 220	2
S8152AV3-0-525		11 70	2
S8152AV3-0-650		11 60	1
S8154-165C005		9 130	AR
S8156E29-032C		3 440	2
		12 440	RF
S8157AU285-125		10 70	1
S8157N136-005		11 40	AR
S8157N136-010		11 40A	AR
S8157N136-020		11 40B	AR
S8316A4		4 120	1
S8990-258		4 20	1
S8991A16L024M		1 240	1
S8991A16L170M		1 20	1
S8991A16L240M		1 120	1

NUMERICAL INDEX

49-23-23

ALPHA - PAGE 1107

MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

PART NO.	AIRLINE STOCK NO.	CH-SECT-UNIT FIG. ITEM	TTL REQ
S9001M18-024		1 230	1
S9001M18-170		1 10	1
S9001M18-240		1 110	1
S9412-012		7 100A	1
S9412-120		7 80A	1
S9412-552		2 140	1
S9412-554		1 50	2
		210	1
		2 50	1
		3 250	RF
		9 20	1
S9413-012		14 170	1
S9413-026		13 220	1
S9413-040		5 40	1
S9413-135		15 20	1
S9413-554		2 90	1
S9413-556		17 90	1
S9413-558		2 250	1
		290	1
		14 140	1
S9413-565		14 160	2
S9421H3-7		16 150	13
S9438A08-46		2 220	1
		3 300	RF
S9438E08-47		2 210	1

NUMERICAL INDEX
49-23-23
ALPHA - PAGE 1108
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

PART NO.	AIRLINE STOCK NO.	CH-SECT-UNIT FIG. ITEM	TTL REQ
107996-81		9 120	1
211-501-9081		1 180	1
211-501-9082		3 30	1
211-528-9005		1 60	1
		90	1
		130	1
		220	2
		260	1
211-577-9014		2 170	2
305179-1		1 150	1
		3 450	RF
337-501-9001		7 90	1
346-508-9001		3 460	1
		12 460	1
352409		10 60	1
353004		11 50	AR
353390-2		11 80	2
354972-6		14 130	1
3600088-1		16 90	AR
3600088-2		16 90A	AR
3600088-3		16 90B	AR
3601070-1		2 70	1
3602361-1		2 10	1
3602839-1		2 270	1
		3 340	RF
		15 1	RF
3603400-1		11 90	1
3603401-1		11 10	1
3603402-1		11 30	1
3603403-1		11 20	1
3604447-1		16 200	1
3604448-1		16 80	1
3608756-1		1 1B	1
		2 1	1
		3 1	1
3608757-1		2 200	1
3608764-1		14 150	1
3608765-1		15 30	1
3608781-1		3 380	1
362-509-9001		4 40	1
362-509-9002		4 40A	1
369019		7 50	1
		130	1
369020		7 40	1
369024		7 60	1

NUMERICAL INDEX
49-23-23
NUMERIC - PAGE 1109
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

PART NO.	AIRLINE STOCK NO.	CH-SECT-UNIT FIG. ITEM	TTL REQ
369259-28		3 260	1
369945-6		4 70	1
369963-3		3 150	1
		8 150	RF
369964-5		4 30	1
370-501-9028		3 490	4
		12 490	RF
370081		4 10	1
370247		9 10	1
370854		9 70	1
375078		9 80	1
376012		5 80	1
376047-1		2 30	1
378050		5 50	1
378050-3		5 60	1
378050-5		5 70	1
379903-120		16 60	1
379908		1 70	1
		3 100	RF
		6 100	RF
379916-3		5 90	1
379920-1		16 130	AR
379920-2		16 130A	AR
379920-3		16 130B	AR
379920-4		16 130C	AR
379920-5		16 130D	AR
379920-6		16 130E	AR
379922		16 30	AR
379972		11 100	1
379975-2		10 50	1
		11 2	1
379977		5 30	1
379981		1 190	1
379992		10 40	1
379995-10		1 80	RF
		17 50	1
380303-2		1 1A	1
		9 1	RF
		17 1	RF
381348-1		1 1	1
394206-5		7 10	1
399-543-9019		1 100	1
399-543-9021		1 30	1
399-587-9006		2 150	1
525-516-9021		17 60	4

NUMERICAL INDEX
49-23-23
NUMERIC - PAGE 1110
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

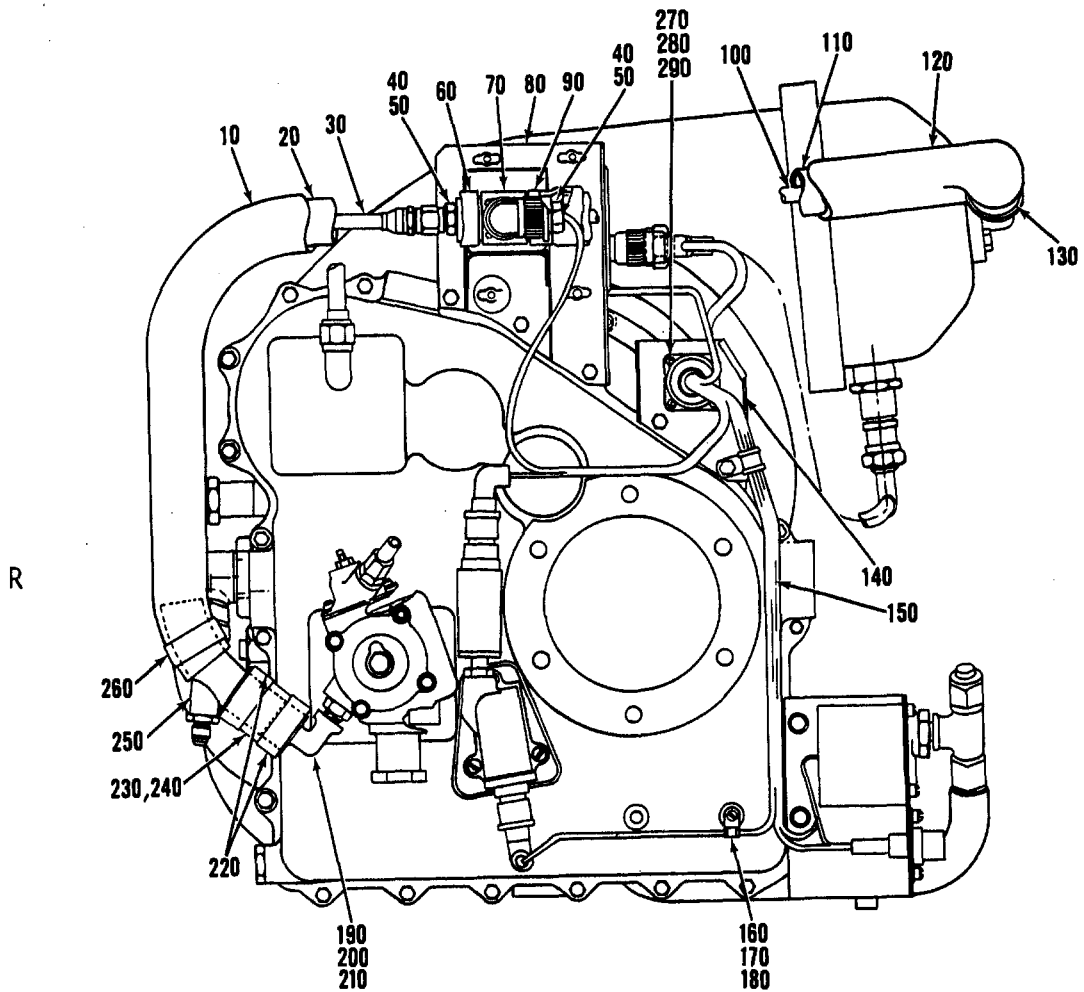
PART NO.	AIRLINE STOCK NO.	CH-SECT-UNIT FIG. ITEM	TTL REQ
583-516-9008		2 110	1
692219-1		16 140	AR
692219-2		16 140A	AR
692219-3		16 140B	AR
692219-4		16 140C	AR
692493		1 250	1
693012		13 210	1
693014		13 200	1
694739		4 80	1
694890-1		10 30A	1
694890-10		10 30	1
695664-1		3 510	1
		12 510	RF
		17 240	1
696330-2		1 140	1
		17 190	1
696369-3		4 100	1
697399-1		9 160	1
697400-1		9 170	1
73000		7 70	1
75735		9 110	1
771-503-9001		3 240	RF
791-503-9001		16 120	32
		160	26
892476-1		16 170	1
892490-2		16 70	1
892491-1		16 180	1
892493-1		4 90	1
892496-1		16 190	1
968087-2		3 500	1
		12 500	RF

NUMERICAL INDEX
49-23-23
NUMERIC - PAGE 1111
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

7. Detailed Parts List and Exploded Views



F-55G-218

Plumbing and Electrical Installation
(Partial Breakdown)
Figure 1

49-23-23
Page 1112
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

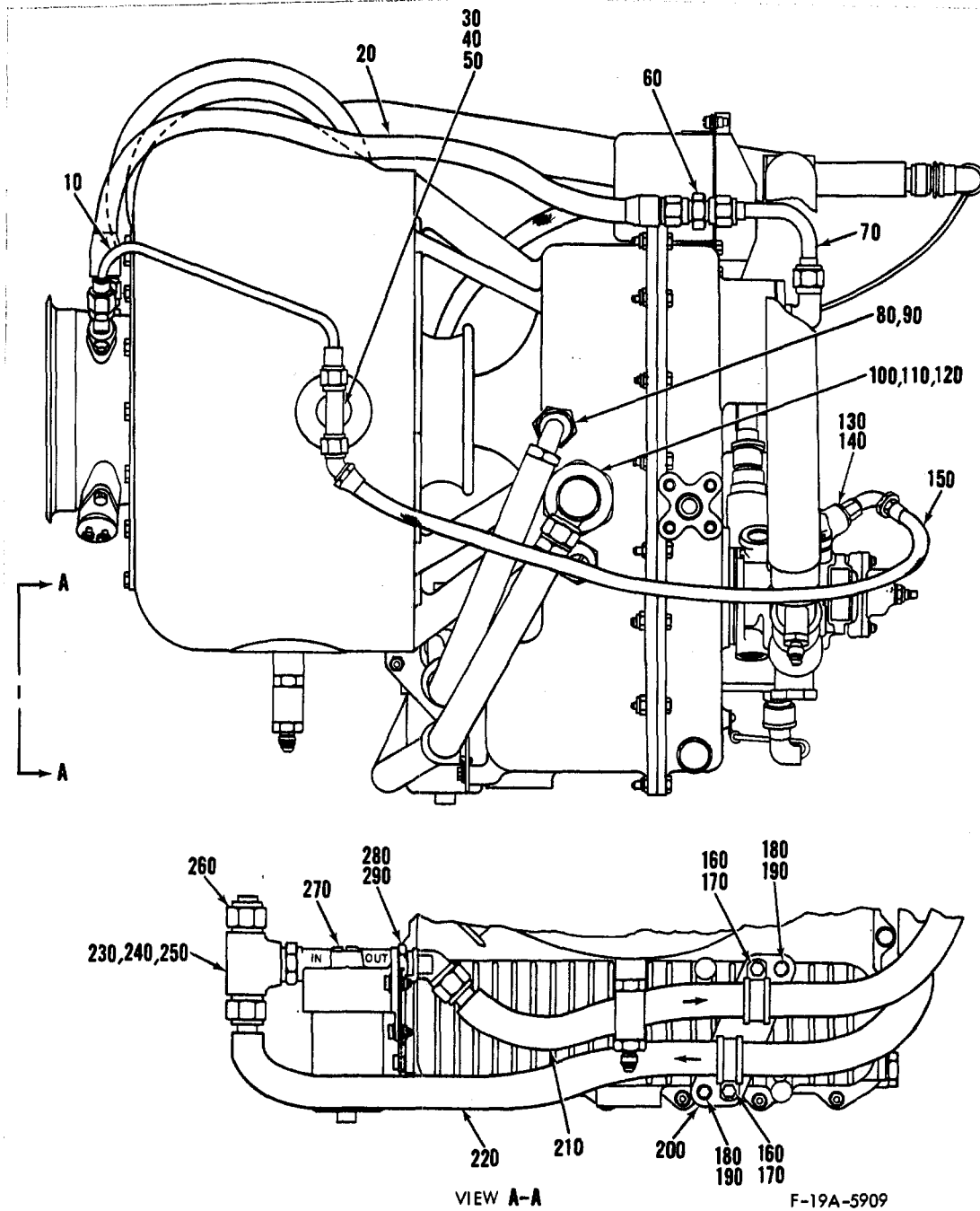
FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
1					
- 1	381348-1		ENGINE-PNEUMATIC AND SHAFT POWER GAS TURBINE (OUTLINE DWG)		1
- 1A	380303-2		..ENGINE ASSY- PNEUMATIC AND SHAFT POWER GAS TURBINE (PARTIAL BKDN)		1
- 1B	3608756-1		..PLUMBING AND ELECTRICAL INSTALLATION		1
10	S9001M18-170		..INSULATION		1
20	S8991A16L170M		..TUBE-RUBBER		1
30	399-543-9021		..HOSE ASSY		1 R
40	AN815-4J		..UNION		2
50	S9412-554		..PACKING		2
60	211-528-9005		..CLAMP		1 R
70	379908		..VALVE-SOLENOID		1
80	379995-10		..BRACKET		RF
90	211-528-9005		..CLAMP		1 R
100	399-543-9019		..CLAMP		1 R
110	S9001M18-240		..INSULATION		1 R
120	S8991A16L240M		..TUBE-RUBBER		1 R
130	211-528-9005		..CLAMP		1 R
140	696330-2		..BRACKET		1
150	305179-1		..HARNESS ASSY-WIRING		1
160	AN500D10-8		..SCREW		1
170	AN960C10L		..WASHER		1
180	211-501-9081		..CLAMP		1 R
190	379981		..ELBOW		1
200	AN924-4J		..NUT (REPL BY ITEM 200A)		1 R
-200A	S8079-286		..NUT (REPLACES ITEM 200)		1 R
210	S9412-554		..PACKING		1
220	211-528-9005		..CLAMP		2 R
230	S9001M18-024		..INSULATION		1
240	S8991A16L024M		..TUBE-RUBBER		1
250	692493		..TUBE ASSY		1
260	211-528-9005		..CLAMP		1 R
270	MS21044N04		..NUT		4 R
280	NAS620C4L		..WASHER		8 R
290	MS35206-217		..SCREW		4 R

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1113
MAY 11/87



MAINTENANCE MANUAL GTCP30-92C(A)



Plumbing and Electrical Installation
(Partial Breakdown)
Figure 2



MAINTENANCE MANUAL
GTCP30-92C(A)

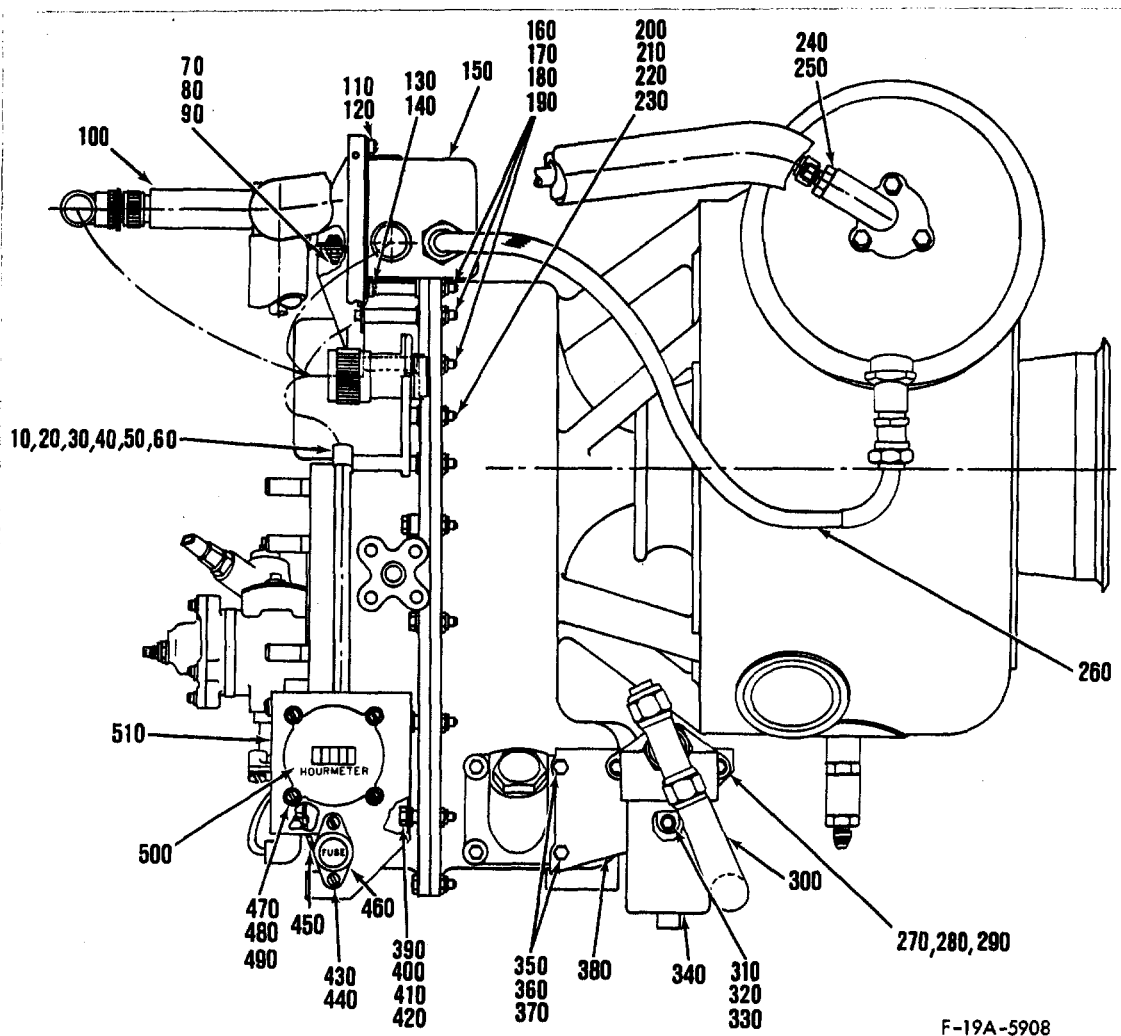
FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
2 - 1	3608756-1		PLUMBING AND ELECTRICAL INSTALLATION (PARTIAL BKDN)		1
10	3602361-1		.TUBE ASSY		1
20	MS8000G210A		.HOSE ASSY		1
30	376047-1		.TEE		1
40	AN924-4J		.NUT		1
50	S9412-554		.PACKING		1
60	AN815-6J		.UNION		1
70	3601070-1		.TUBE ASSY		1
80	AN919-10J		.REDUCER		1
90	S9413-554		.PACKING		1
100	AN775-8J		.BOLT		1
110	583-516-9008		.PACKING		1 R
120	AN776-8J		.ELBOW		1
130	AN919-1J		.REDUCER		1
140	S9412-552		.PACKING		1
150	399-587-9006		.TUBE ASSY		1 R
160	MS20074-03-03		.BOLT		2
170	211-577-9014		.CLAMP		2 R
180	MS20074-03-03		.BOLT		2 R
			(REPL BY ITEM 180A)		
-180A	AN3CH4A		.BOLT		2 R
			(REPLACES ITEM 180)		
190	AN960C10L		.WASHER		2
200	3608757-1		.PLATE ASSY		1
210	S9438E08-47		.HOSE ASSY		1
220	S9438A08-46		.HOSE ASSY		1
230	AN834-8J		.TEE		1
240	AN924-8J		.NUT		1
250	S9413-558		.PACKING		1
260	AN929-8J		.CAP		1
270	3602839-1		.FILTER ASSY-OIL (SEE FIG. 15 FOR BKDN)		1
280	AN837-8J		.ELBOW		1
290	S9413-558		.PACKING		1

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1115
MAY 11/87



MAINTENANCE MANUAL GTCP30-92C(A)



Engine Assembly (Plumbing and Electrical
Installation (Partial Breakdown)
Figure 3

49-23-23
Page 1116
May 11/87



MAINTENANCE MANUAL GTCP30-92C(A)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
3					
- 1	3608756-1		PLUMBING AND ELECTRICAL INSTALLATION (PARTIAL BKDN)		1
10	MS21044N3		.NUT		1
20	AN3C23A		.BOLT		1
30	211-501-9082		.CLAMP		1 R
40	AN960C10L		.WASHER		1
50	NAS43DD3-11		.SPACER		1
60	NAS43DD3-80		.SPACER		1
70	MS21044N3		.NUT		2
80	AN960C10L		.WASHER		2
90	MS35266-64		.SCREW		2
100	379908		.VALVE-SOLENOID		RF
110	MS35266-62		.SCREW		3
120	AN960C10L		.WASHER		3
130	MS35266-64		.SCREW		1
140	AN960C10L		.WASHER		1
150	369963-3		.IGNITION UNIT		1
160	MS21044N3		.NUT		3
170	AN3C21A		.BOLT		3 R
			(REPL BY ITEM 170A)		
-170A	MS9489-30		.BOLT		3 R
			(REPLACES ITEM 170)		
180	NAS43DD3-80		.SPACER		3
190	AN960C10L		.WASHER		3
200	MS21044N3		.NUT		1
210	AN3C11A		.BOLT		1
220	NAS43DD3-11		.SPACER		1
230	AN960C10L		.WASHER		1
240	771-503-9001		.VALVE-CHECK		RF R
250	S9412-554		.PACKING		RF
260	369259-28		.LEAD ASSY-IGNITER		1
270	MS21083N3		.NUT		2
280	AN3C4A		.BOLT		2
290	AN960C10L		.WASHER		2
300	S9438A08-46		.HOSE ASSY		RF
310	MS21083N3		.NUT		1
320	AN3C3A		.BOLT		1
330	AN960C10L		.WASHER		1
340	3602839-1		.FILTER ASSY-OIL (SEE FIG. 15 FOR BKDN)		RF
350	MS20074-03-06		.BOLT		2

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1117
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
3					
360	AN960C10L		.WASHER		2
370	NAS43DD3-8		.SPACER		2
380	3608781-1		.BRACKET		1
390	MS21044N3		.NUT		RF
400	AN3C12A		.BOLT		RF
410	S8128C10-49-5A		.SPACER		RF
420	AN960C10L		.WASHER		RF
430	AN515-6R10		.SCREW		2
440	S8156E29-032C		.WASHER		2
450	305179-1		.HARNESS ASSY-WIRING		RF
460	346-508-9001		..FUSEHOLDER		1 R
470	AN515-6R14		.SCREW		4
480	AN960C6L		.WASHER		4
490	370-501-9028		.GROMMET		4 R
500	968087-2		.HOURMETER		1
510	695664-1		.BRACKET		1

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1118
MAY 11/87

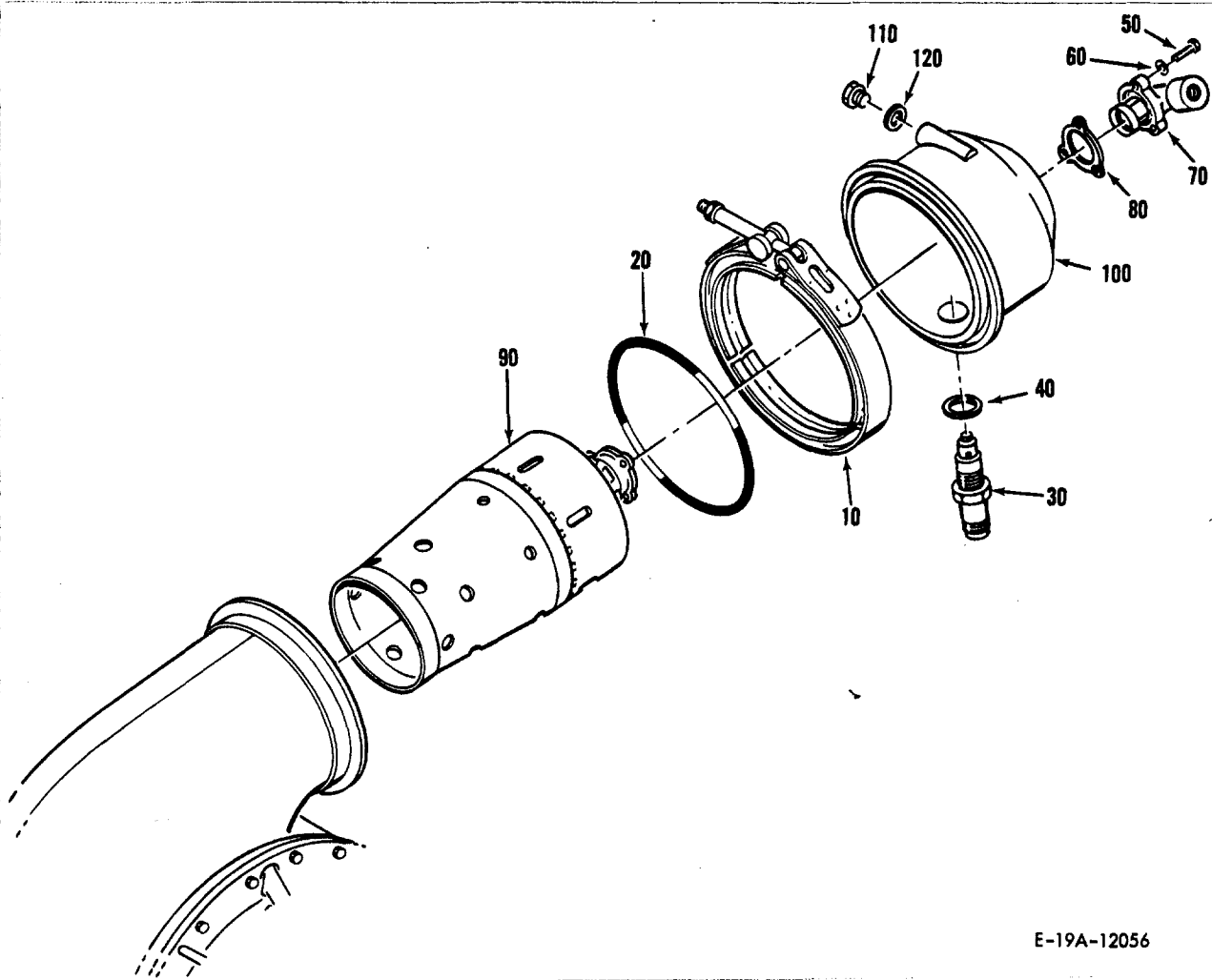


MAINTENANCE MANUAL
GTCP30-92C(A)

THIS PAGE INTENTIONALLY LEFT BLANK



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12056

Combustion Components
Figure 4

49-23-23
Page 1120
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
4					RF
- 1	NONPROC1		COMBUSTION COMPONENTS		1
10	370081		.COUPLING-QUICK COUPLER	..	1
20	S8990-258		.PACKING		1
30	369964-5		.PLUG ASSY-IGNITER		1
40	362-509-9001		.GASKET		1
- 40A	362-509-9002		.GASKET		1
			(ALTN PART FOR ITEM 40)		
50	AN4CH5A		.BOLT		3
60	AN960-416L		.WASHER		3
70	369945-6		.ATOMIZER ASSY-FUEL		1
			(REFER TO REPORT NO. 49-30-39)		
80	694739		.GASKET-ATOMIZER		1
90	892493-1		.LINER-COMBUSTION CHAMBER		1
100	696369-3		.CAP-COMBUSTOR		1
110	AN814-4SL		.PLUG		1
120	S8316A4		.PACKING		1

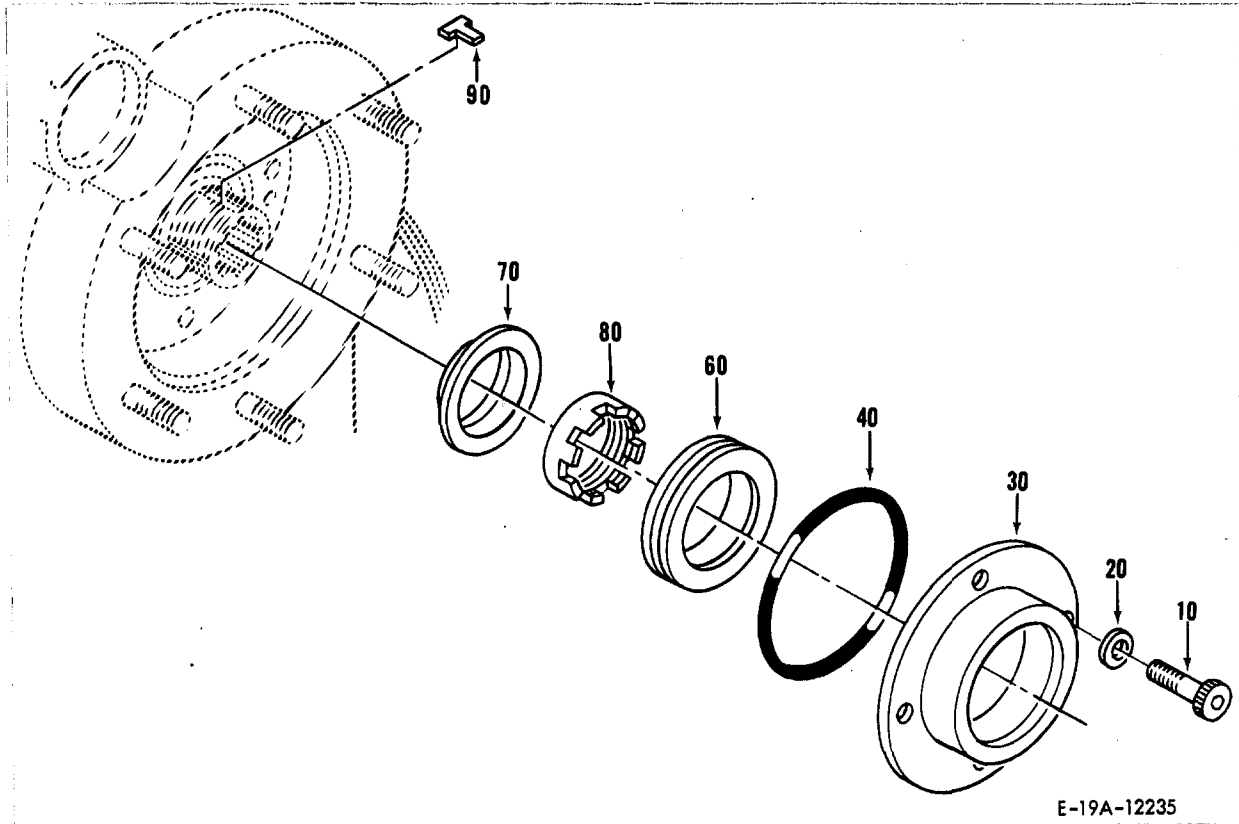
R
R

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1121
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)



Output Shaft Seal Assembly
Figure 5

49-23-23
Page 1122
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

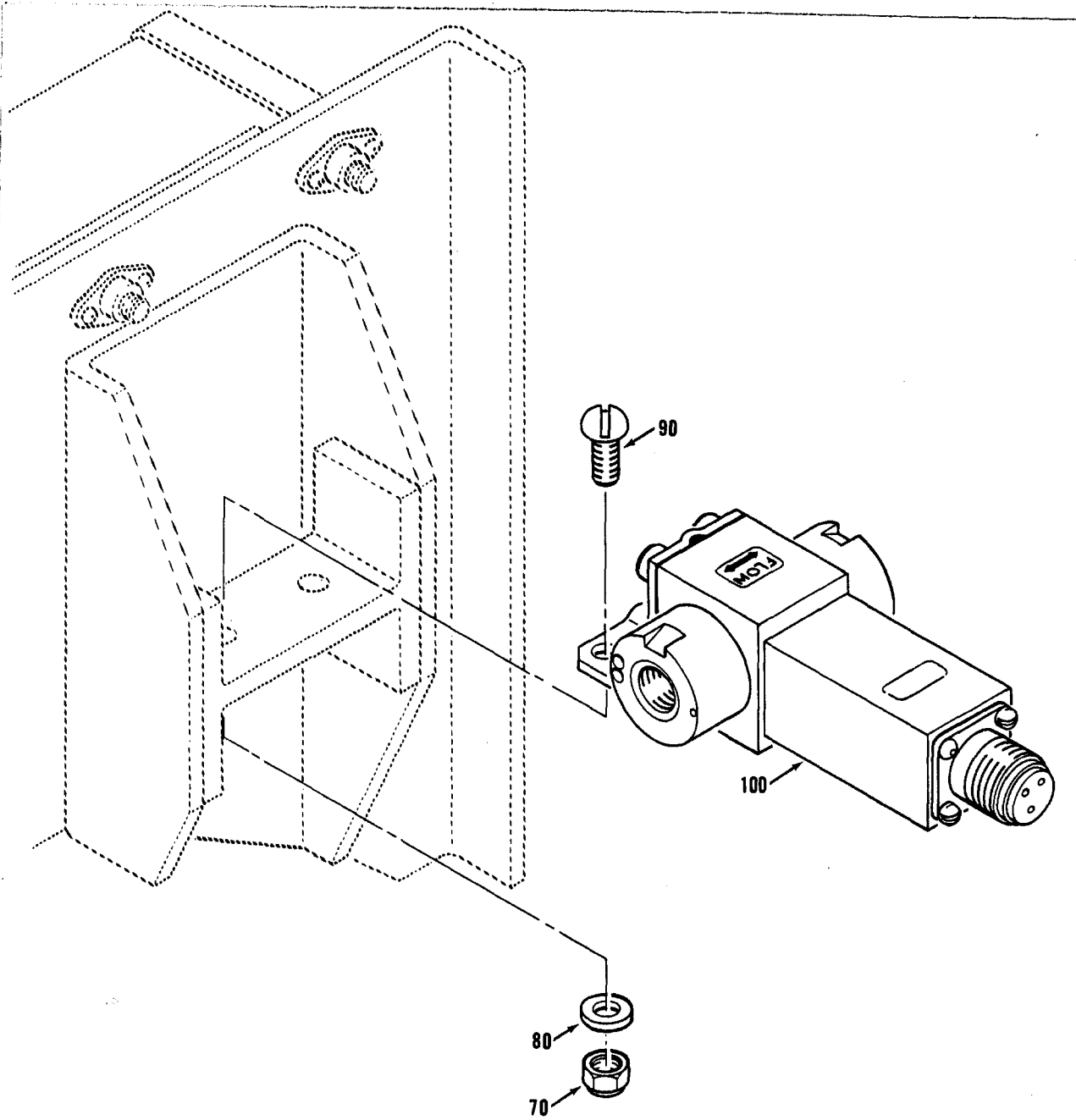
FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
5					
10	NAS609C3-10		SCREW		4
20	AN960C10L		WASHER		4
30	379977		RETAINER-OUTPUT SHAFT SEAL		1
40	S9413-040		PACKING		1
- 50	378050		SEAL SET-MATCHED BEARING (PARTIAL BKDN)		1
60	378050-3		..STATOR		1
70	378050-5		..ROTOR		1
80	376012		NUT-OUTPUT SHAFT		1
90	379916-3		KEY		1

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1123 R
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12237

Fuel Solenoid Valve
Figure 6



MAINTENANCE MANUAL
GTCP30-92C(A)

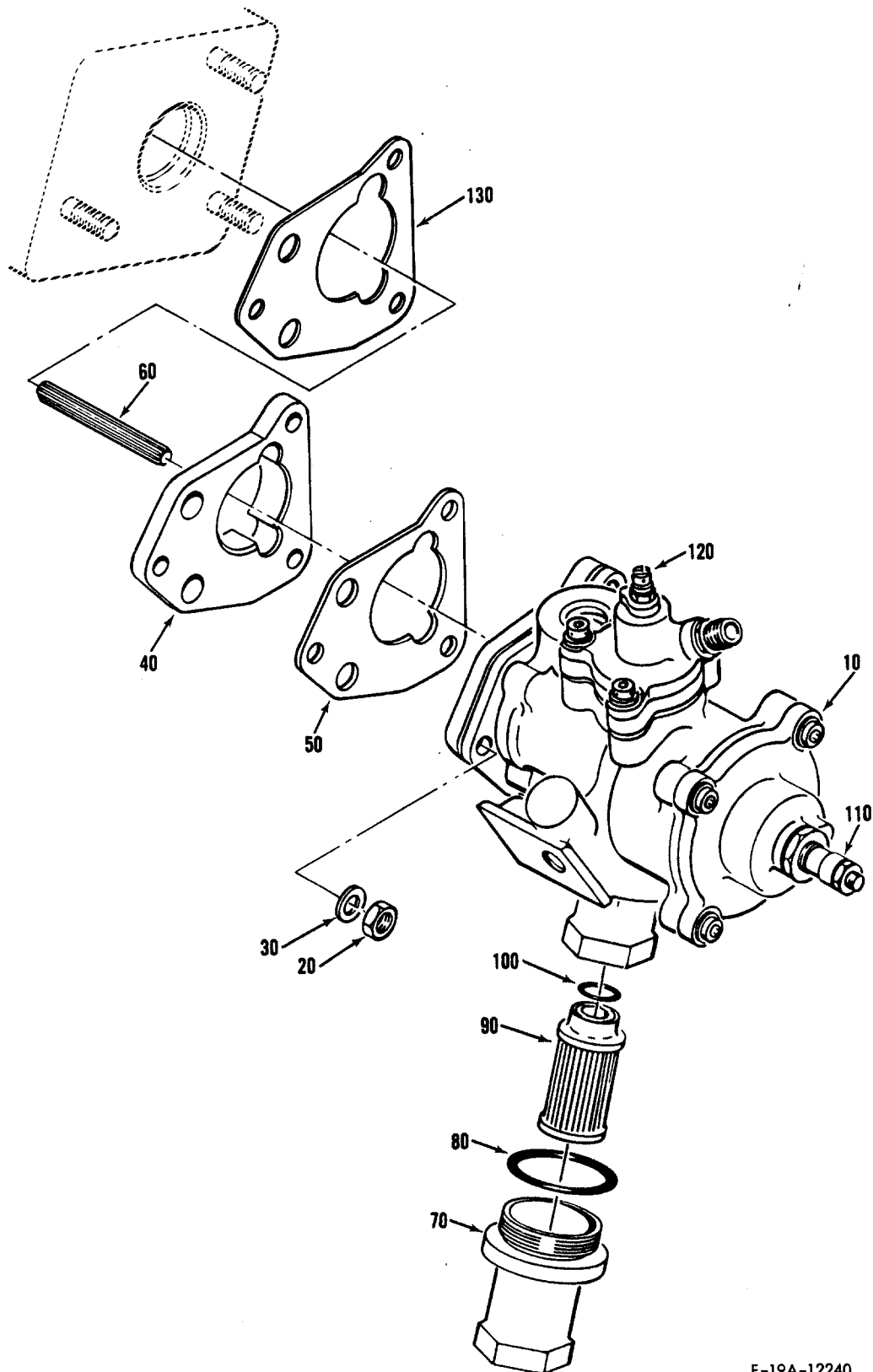
FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
6					
70	MS21044N3		NUT		RF
80	AN960C10L		WASHER		RF
90	MS35266-64		SCREW		RF
100	379908		VALVE-FUEL SOLENOID		RF

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1125 R
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12240

Fuel Control Unit Components
Figure 7



MAINTENANCE MANUAL
GTCP30-92C(A)

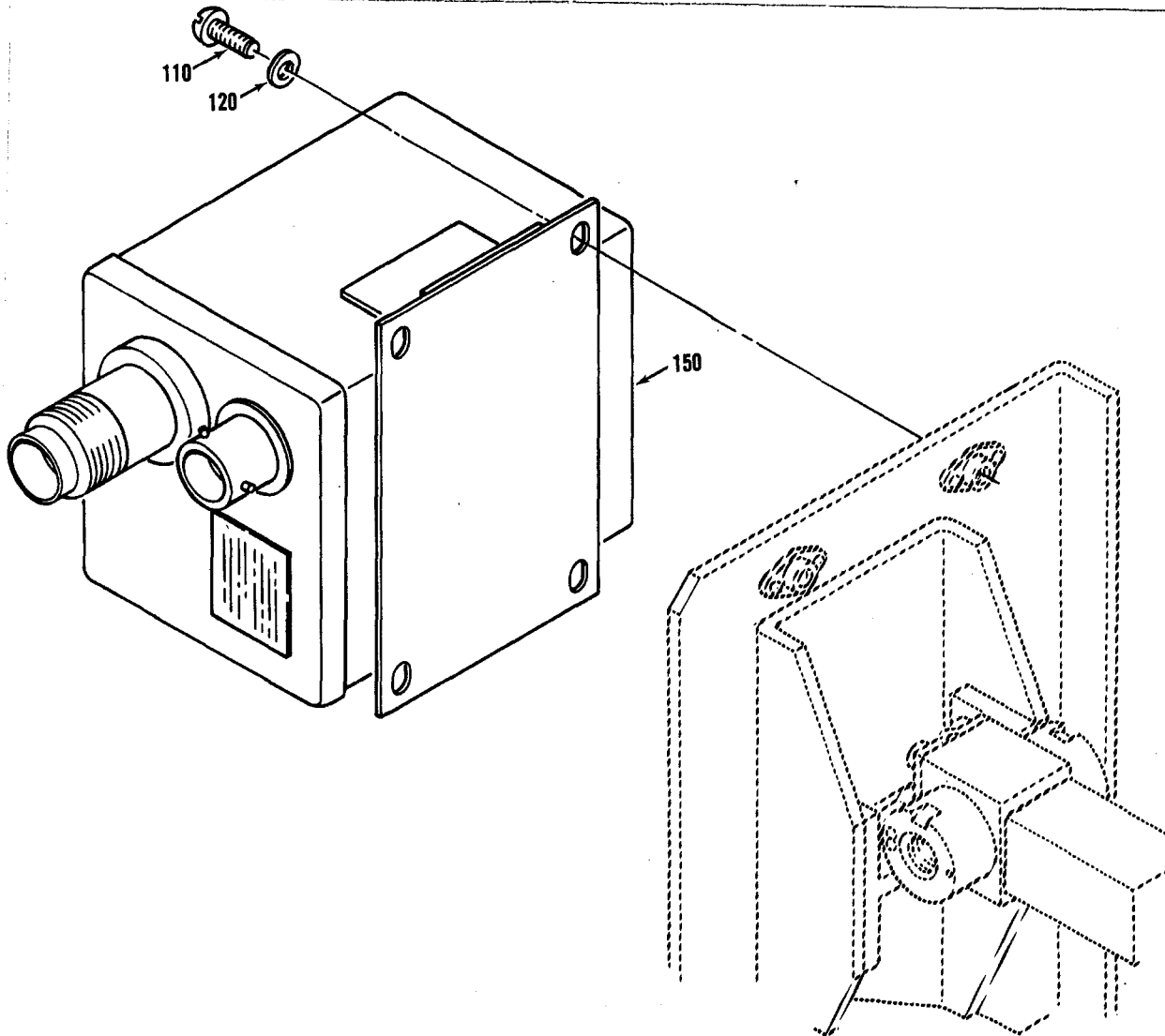
FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
7					
- 10	394206-5		CONTROL UNIT-FUEL		1
20	NAS129C3M		.NUT		3
30	NAS620C10L		.WASHER		3
40	369020		.INSULATOR		1
50	369019		.GASKET		1
60	369024		.SHAFT		1
70	73000		.CAP		1
80	MS29513-120		.PACKING		1
- 80A	S9412-120		.PACKING (ALTN PART FOR ITEM 80)		1
90	337-501-9001		.ELEMENT-FILTER		1 R
100	MS29513-12		.PACKING		1
-100A	S9412-012		.PACKING (ALTN PART FOR ITEM 100)		1
110	NONPROC1		.ADJUSTING SCREW-FUEL CONTROL GOVERNOR		1
120	NONPROC2		.ADJUSTING SCREW- START PRESSURE (ACCELERATION LIMITER)		1
130	369019		.GASKET		1

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1127
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12062

Ignition Unit
Figure 8



MAINTENANCE MANUAL
GTCP30-92C(A)

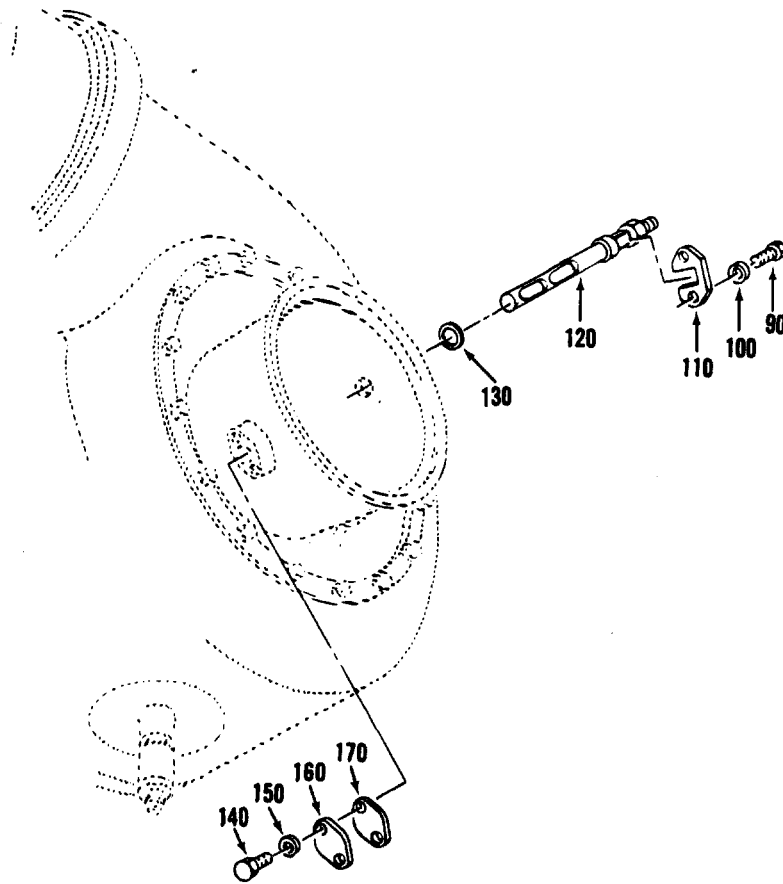
FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
8	AN501D10		SCREW		RF R
110			(REPL BY ITEM 10A)		
-110A	MS35266-64		SCREW		RF R
			(REPLACES ITEM 110)		
120	AN960C10L		WASHER		RF
150	369963-3		UNIT-IGNITION		RF

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1129
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)



E-55G-437

Pneumatic Thermostat Exhaust
Gas Temperature Thermocouple
Figure 9

49-23-23
Page 1130
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

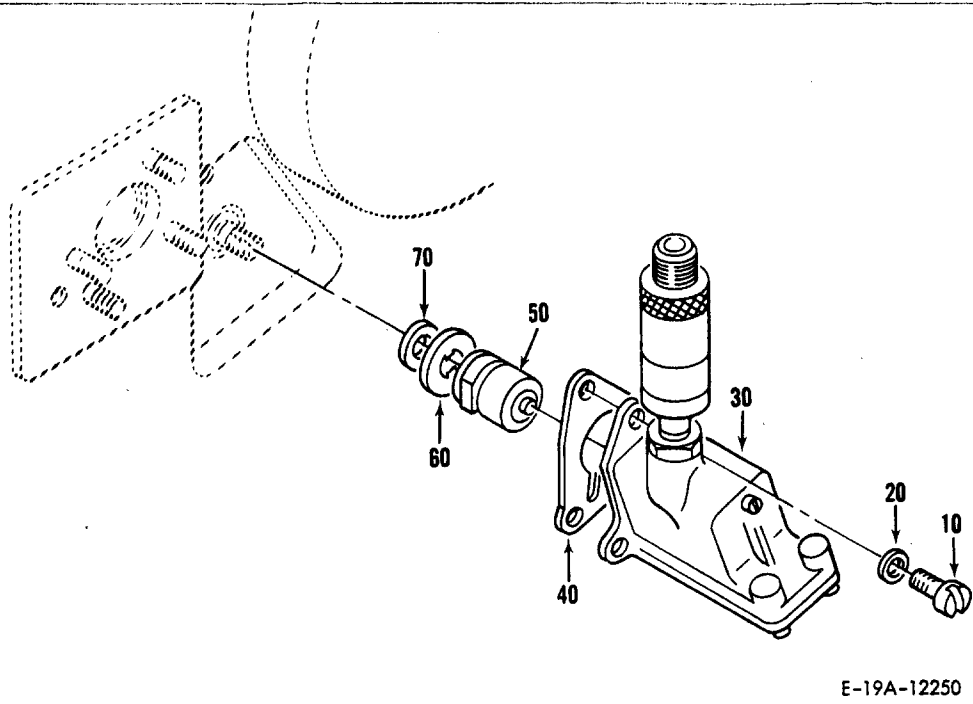
FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
9 - 1	380303-2		ENGINE ASSY-PNEUMATIC AND SHAFT POWER GAS TURBINE (PARTIAL BKDN) (SEE FIG. 1 FOR NHA)		RF
10	370247		.VALVE-FUEL DRAIN		1
20	S9412-554		.PACKING		1
30	F5C1032-1		.NUT (V85639)		1
40	F5C832-1		.NUT (V85639)		1
50	AN3CH3A		.BOLT		2
60	AN960C10L		.WASHER		2
70	370854		.THERMOCOUPLE-EXHAUST GAS TEMPERATURE		1
80	375078		.GASKET		1
90	AN3CH3A		.BOLT		2
100	AN960C10L		.WASHER		2
110	75735		.PLATE		1
120	107996-81		.THERMOSTAT-PNEUMATIC (ACCELERATION CONTROL)		1
130	S8154-165C005		.WASHER-SHIM		AR
140	AN3CH3A		.BOLT		2
150	AN960C10L		.WASHER		2
160	697399-1		.COVER		1
170	697400-1		.GASKET		1

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1131 R
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12250

Accessory Sub-Assembly No. 1
Figure 10

49-23-23
Page 1132
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

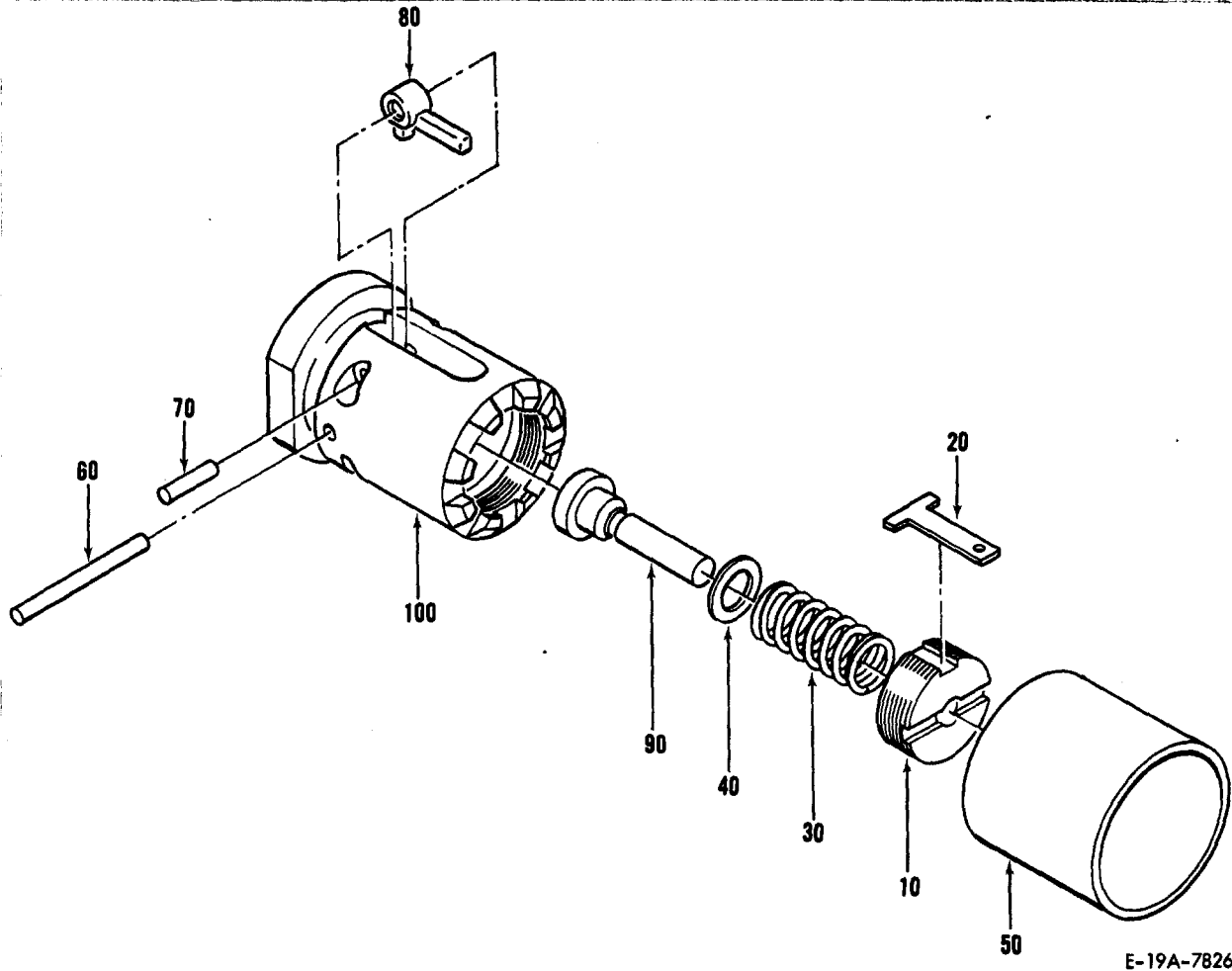
FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
10 - 1	NONPROC1		ACCESSORY SUB-ASSEMBLY NO. 1 (NONPROCURABLE) (PARTIAL BKDN)		1
10	AN500AD10-8		.SCREW (REPL BY ITEM 10A)		3 R
- 10A	MS35275-263		.SCREW (REPLACES ITEM 10)		3 R
20	AN960C10L		.WASHER		3
30	694890-10		.SWITCH ASSY-OVERSPEED (REPL BY ITEM 30A)		1 R
- 30A	694890-1		.SWITCH ASSY-OVERSPEED (REPLACES ITEM 30)		1 R
40	379992		.GASKET		1
50	379975-2		.GOVERNOR ASSY		1
60	352409		.WASHER-KEY		1
70	S8157AU285-125		.WASHER		1

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1133
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-7826

Accessory Sub-Assembly No. 2
Figure 11

49-23-23
Page 1134
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

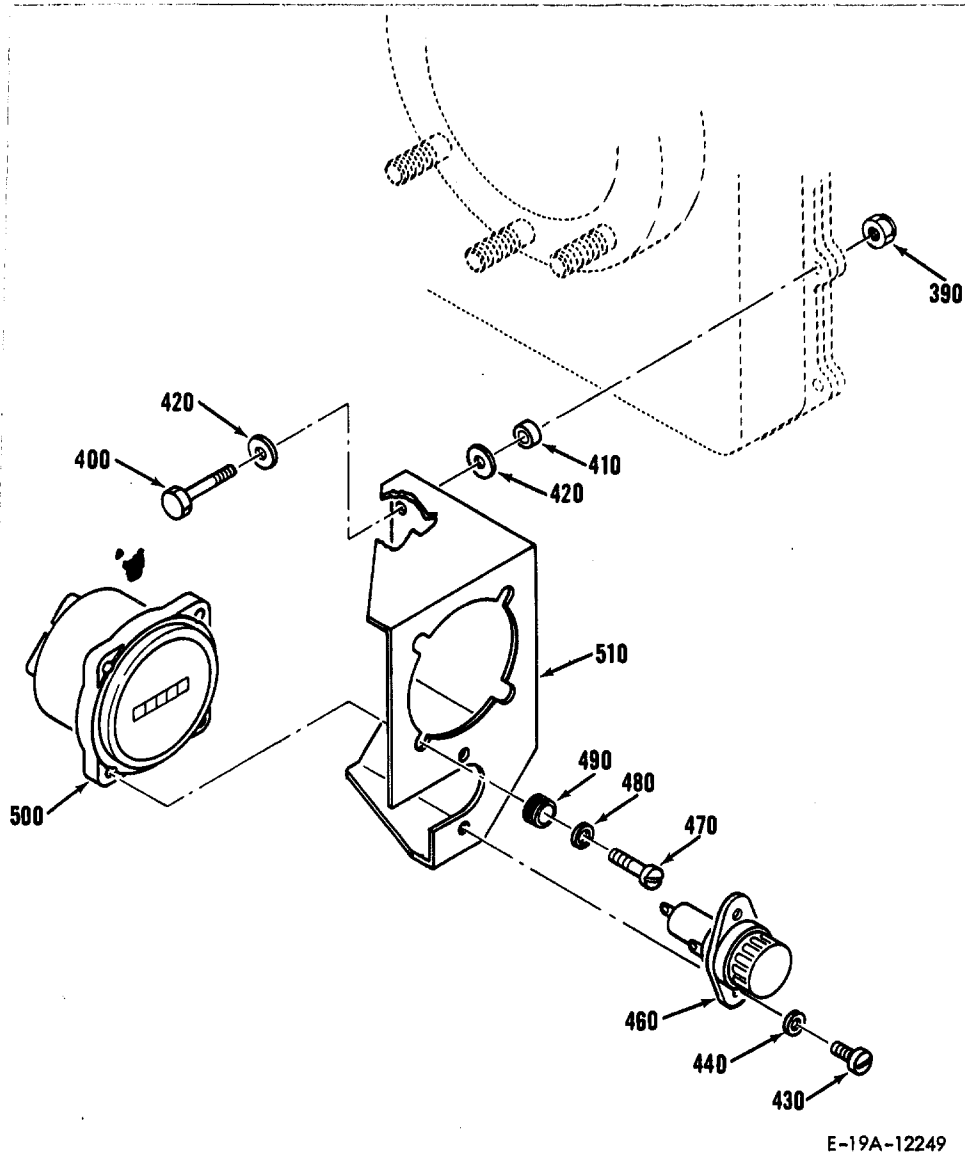
FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
11					
- 1	NONPROC2		ACCESSORY SUB-ASSEMBLY NO. 2 (NONPROCURABLE) (PARTIAL BKDN)		1
- 2	379975-2		..GOVERNOR ASSY		1
10	3603401-1		..SCREW-ADJUSTING		1
20	3603403-1		..KEY-LOCKING		1
30	3603402-1		..SPRING		1
40	S8157N136-005		..WASHER (0.005 INCH THICK)	AR	R
- 40A	S8157N136-010		..WASHER (0.010 INCH THICK)	AR	R
- 40B	S8157N136-020		..WASHER (0.020 INCH THICK)	AR	R
50	353004		..SLEEVE-GOVERNOR	AR	
60	S8152AV3-0-650		..PIN		1
70	S8152AV3-0-525		..PIN		2
80	353390-2		..FLYWEIGHT-GOVERNOR		2
90	3603400-1		..SHAFT-GOVERNOR		1
100	379972		..BODY-GOVERNOR		1

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1135
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)



Hourmeter
Figure 12

49-23-23
Page 1136
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

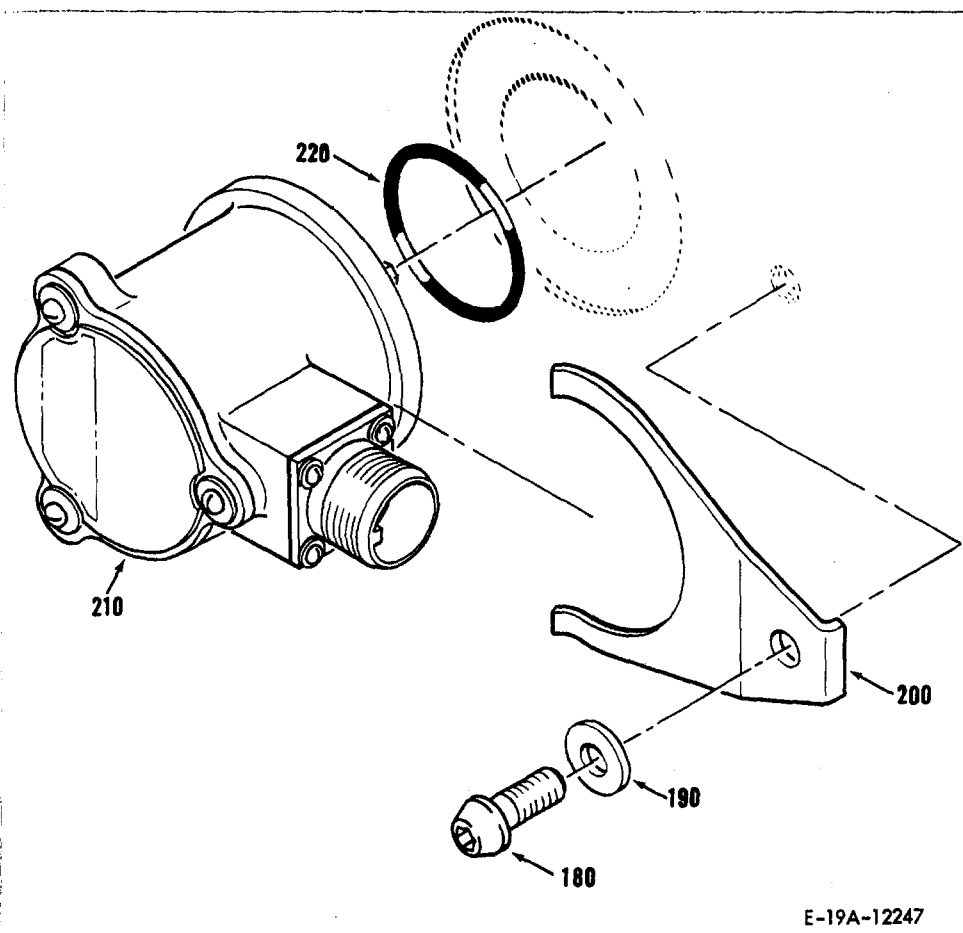
FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
12					
390	MS21044N3		NUT		RF
400	AN3C12A		BOLT		RF
410	S8128C10-49-5A		SPACER		RF
420	AN960C10L		WASHER		RF
430	AN515-6R10		SCREW		RF
440	S8156E29-032C		WASHER		RF
460	346-508-9001		FUSEHOLDER		1 R
470	AN515-6R14		SCREW		RF
480	AN960C6L		WASHER		RF
490	370-501-9028		GROMMET		RF R
500	968087-2		HOURLMETER		RF
-510	695664-1		BRACKET ASSY		RF

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1137
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)



Tachometer-Generator
Figure 13

49-23-23
Page 1138
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

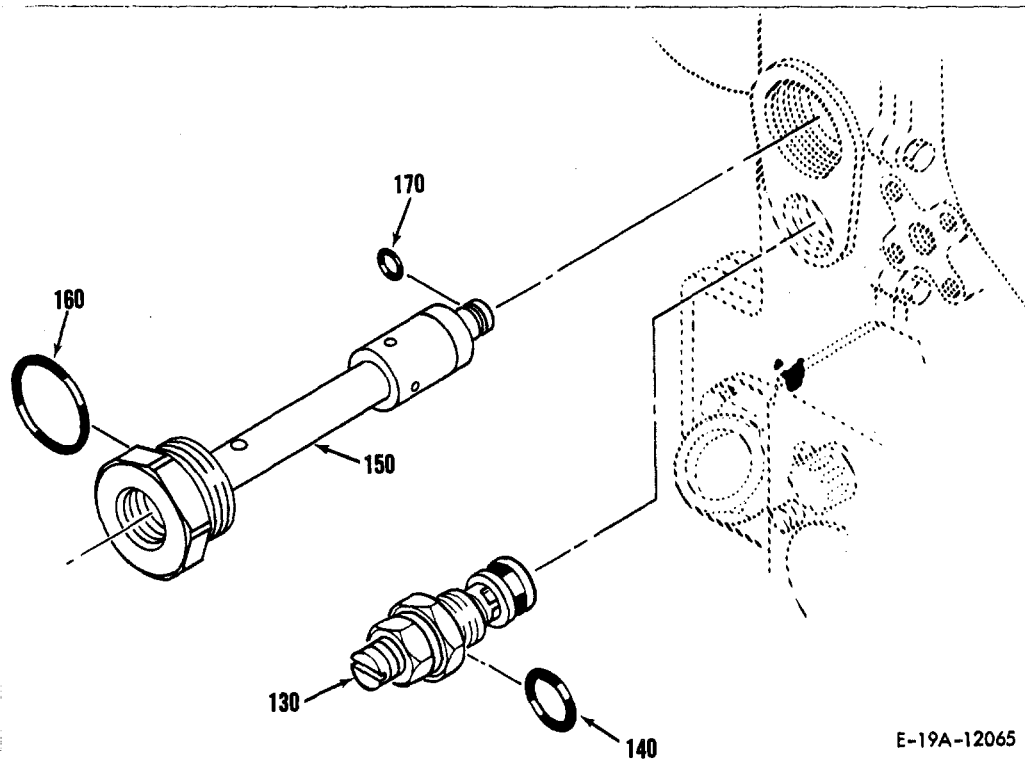
FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
13					
180	MS20074-04-05		BOLT		1
190	AN960C416L		WASHER		1
200	693014		CLAMP		1
210	693012		TACHOMETER-GENERATOR		1
220	S9413-026		PACKING		1

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1139 R
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)



Accessory Sub-Assembly No. 3
Figure 14

49-23-23
Page 1140
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

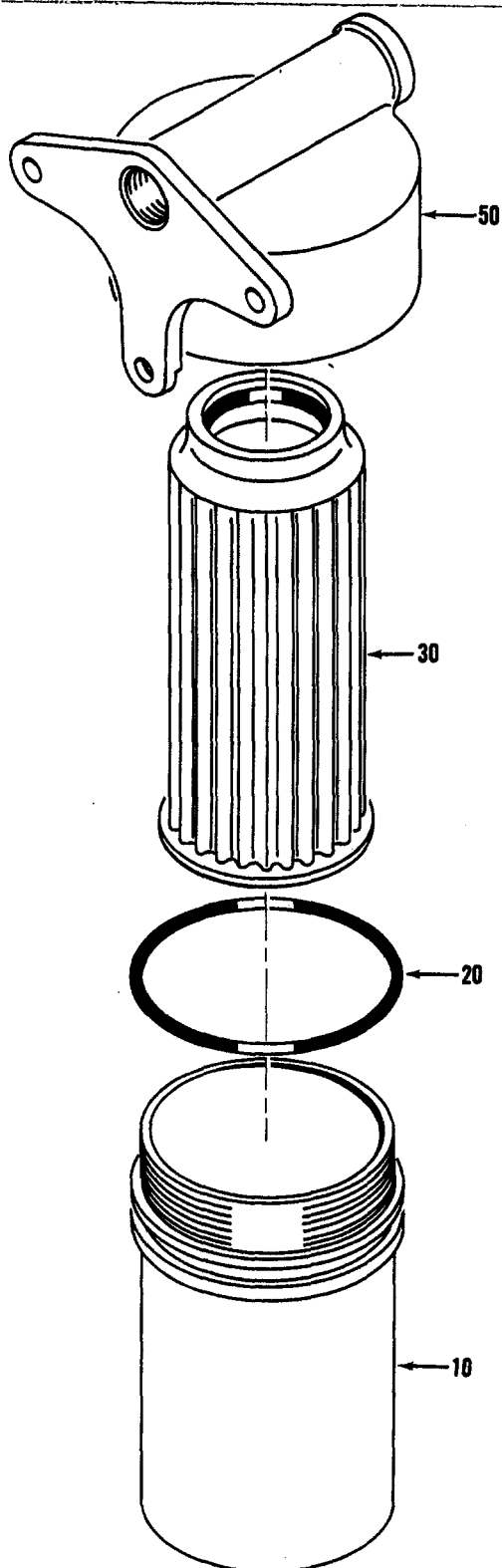
FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
14 - 1	NONPROC3		ACCESSORY SUB-ASSEMBLY NO. 3 (NONPROCURABLE) (PARTIAL BKDN)		1
130	354972-6		.REGULATOR ASSY- OIL PRESSURE		1
140	S9413-558		.PACKING		1
150	3608764-1		.VALVE-OIL PRESSURE RELIEF		1
160	S9413-565		.PACKING		2
170	S9413-012		.PACKING		1

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1141 R
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)



E-19A-12246

Oil Filter Assembly
Figure 15



MAINTENANCE MANUAL
GTCP30-92C(A)

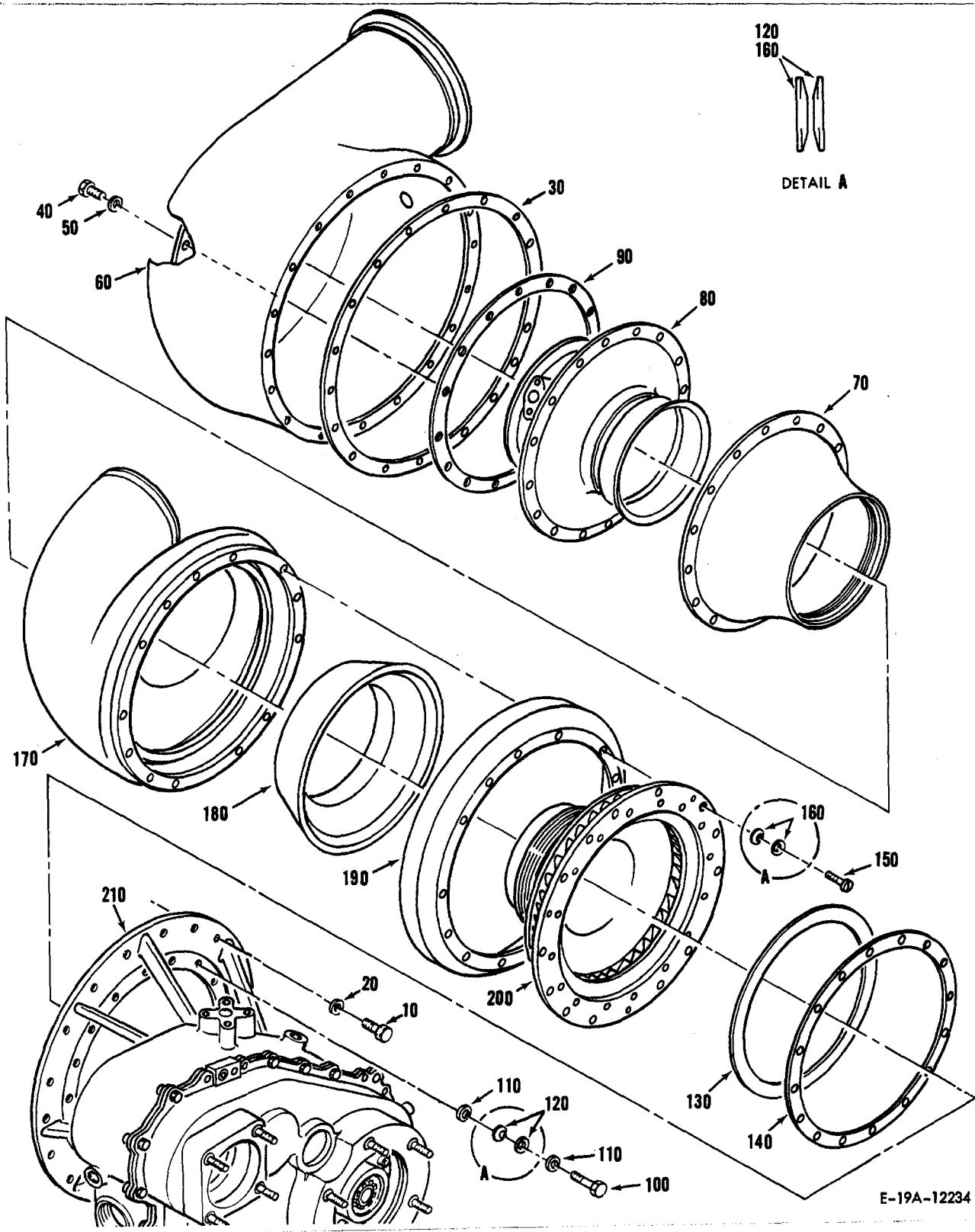
FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
15 - 1	3602839-1		FILTER ASSY-OIL (REMOTELY LOCATED)		RF
10	ORDERNHA		.HOUSING-OIL FILTER (ORDER NHA)		1
20	S9413-135		.PACKING		1
30	3608765-1		.ELEMENT-OIL FILTER		1
50	ORDERNHA		.COVER-OIL FILTER (ORDER NHA)		1

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1143 R
MAY 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)



Engine Assembly (Power Section)
Figure 16

49-23-23
Page 1144
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
16 - 1	NONPROC4		ENGINE ASSY(POWER SECTION) (NONPROCURABLE) (PARTIAL BKDN)		1
10	MS20074-03-06		.BOLT		18
20	AN960C10L		.WASHER		36
30	379922		.GASKET-PLENUM		AR
40	AN3CH5A		.BOLT		16
50	AN960C10L		.WASHER		16
60	379903-120		.PLENUM ASSY-TURBINE		1
70	892490-2		.CONE ASSY-ADAPTER		1
80	3604448-1		.DUCT-TURBINE EXHAUST		1
90	3600088-1		.SHIM-PLENUM (0.032 INCH THICK)		AR
- 90A	3600088-2		.SHIM-PLENUM (0.063 INCH THICK)		AR
- 90B	3600088-3		.SHIM-PLENUM (0.090 INCH THICK)		AR
100	AN3CH12A		.BOLT		16
110	AN960C10L		.WASHER		32
120	791-503-9001		.WASHER-SPRING		32
130	379920-1		.SHIM-COMPRESSOR SEAL (0.005 INCH THICK)		AR
-130A	379920-2		.SHIM-COMPRESSOR SEAL (0.007 INCH THICK)		AR
-130B	379920-3		.SHIM-COMPRESSOR SEAL (0.010 INCH THICK)		AR
-130C	379920-4		.SHIM-COMPRESSOR SEAL (0.016 INCH THICK)		AR
-130D	379920-5		.SHIM-COMPRESSOR SEAL (0.020 INCH THICK)		AR
-130E	379920-6		.SHIM-COMPRESSOR SEAL (0.025 INCH THICK)		AR
140	692219-1		.SHIM-TURBINE WHEEL (0.002 INCH THICK)		AR
-140A	692219-2		.SHIM-TURBINE WHEEL (0.003 INCH THICK)		AR
-140B	692219-3		.SHIM-TURBINE WHEEL (0.010 INCH THICK)		AR
-140C	692219-4		.SHIM-TURBINE WHEEL (0.020 INCH THICK)		AR
150	S9421H3-7		.SCREW		13
160	791-503-9001		.WASHER-SPRING		26

R

R

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1145
MAY 11/87

MAINTENANCE MANUAL
GTCP30-92C(A)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
16					
170	892476-1		.TORUS ASSY-TURBINE		1
180	892491-1		.RING-CONTAINMENT		1
190	892496-1		.RING-CONTAINMENT		1
200	3604447-1		.NOZZLE ASSY-TURBINE		1

— ITEM NOT ILLUSTRATED

49-23-23
PAGE 1146 R
MAY 11/87

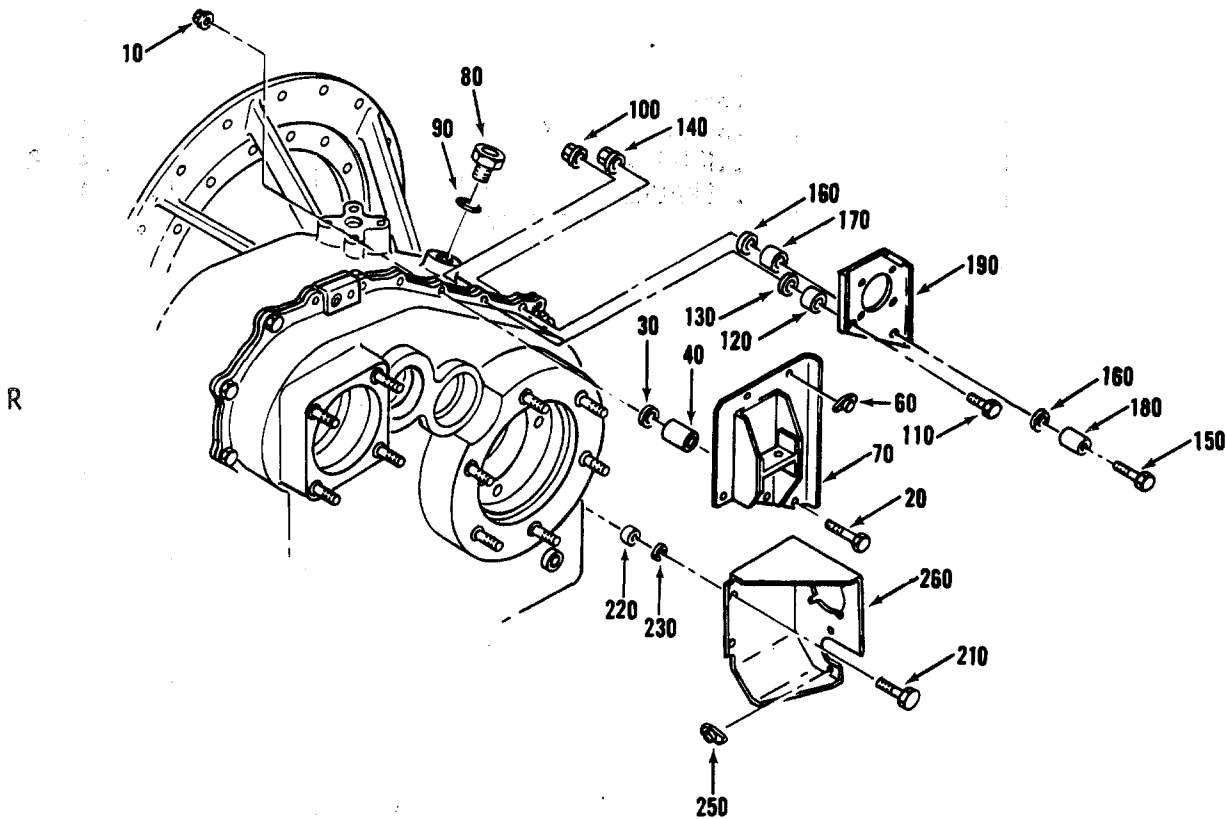


MAINTENANCE MANUAL
GTCP30-92C(A)

THIS PAGE INTENTIONALLY LEFT BLANK



MAINTENANCE MANUAL
GTCP30-92C(A)



E-55G-427

Engine Assembly (Brackets)
Figure 17

R NOTE: Pages 1151 through 1158 deleted.

49-23-23
Page 1148
May 11/87



MAINTENANCE MANUAL
GTCP30-92C(A)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	1234567 NOMENCLATURE	EFFECT (USE) CODE	UNITS PER ASSY
17 - 1	380303-2		ENGINE ASSY-PNEUMATIC AND SHAFT POWER GAS TURBINE (PARTIAL BKDN)		RF
10	MS21044N3		.NUT		3
20	AN3C21A		.BOLT		3
			(REPL BY ITEM 20A)		
- 20A	MS9489-30		.BOLT		3
			(REPLACES ITEM 20)		
30	AN960C10L		.WASHER		3
40	NAS43DD3-80		.SPACER		3
- 50	379995-10		.BRACKET ASSY		1
60	525-516-9021		..NUTPLATE		4
70	ORDERNHA		..BRACKET		1
			(NONPROCURABLE) (ORDER NHA)		
80	AN814-6D		.PLUG		1
90	S9413-556		.PACKING		1
100	MS21044N3		.NUT		1
110	AN3C11A		.BOLT		1
120	NAS43DD3-11		.SPACER		1
130	AN960C10L		.WASHER		1
140	MS21044N3		.NUT		1
150	AN3C23A		.BOLT		1
160	AN960C10L		.WASHER		2
170	NAS43DD3-11		.SPACER		1
180	NAS43DD3-80		.SPACER		1
190	696330-2		.BRACKET ASSY		1
-200	MS21044N3		.NUT		2
210	AN3C12A		.BOLT		2
220	S8128C10-49-5A		.SPACER		2
230	AN960C10L		.WASHER		2
-240	695664-1		.BRACKET ASSY-MOUNTING		1
250	NAS1023C06W		..NUTPLATE		2
260	ORDERNHA		..BRACKET		1
			(ORDER NHA)		

— ITEM NOT ILLUSTRATED